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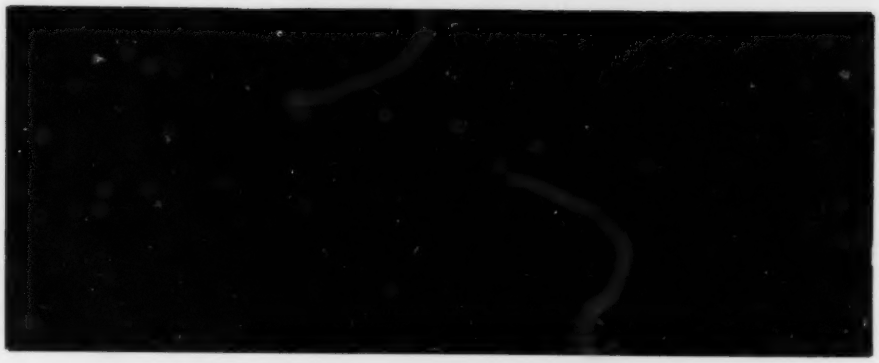

Keeping the agriculture and food industries competitive through Research, Development and Demonstration.

SELECTION AND EVALUATION OF IMPROVED HIGH YIELDING SPRING WHEATS FOR THE CANADA PRAIRIE AND SOFT WHITE SPRING CLASSES

FINAL REPORT
(ERDA PROJECT NO. 1.1 - 11)

PREPARED BY:

R.J. GRAF
WHEAT BREEDER
SASKATCHEWAN WHEAT POOL
PRODUCT DEVELOPMENT

P.HUCL
SENIOR WHEAT BREEDER
SASKATCHEWAN WHEAT POOL
PRODUCT DEVELOPMENT

This project was made possible by the cooperative funding of the Agriculture Development Fund through the Canada/Saskatchewan Economic and Regional Development Agreement and the Saskatchewan Wheat Pool. Full technical results of the three-year trial are on file at the offices of Saskatchewan Wheat Pool-Product Development and the Agriculture Development Fund.

A. EXECUTIVE SUMMARY

1. Abstract

The main objective of the "CPS/CWSWS selection and evaluation project" was to develop superior varieties for production by the Canadian prairie farmer. Program initiation in 1986 was with material generated between 1981 and 1985, with several lines entering the preliminary yield testing stage in 1987 and 1988. Unfortunately, most of these lines have one or more deficiencies which will preclude registration. Each year, a large amount of effort is put into making new crosses that incorporate improved agronomics, quality and disease resistance. Selections from these improved populations will begin yield testing in 1989 with potential candidates for registration available in 1995.

2. Summary

The primary objective of the project entitled, "Selection and evaluation of improved high yielding spring wheats for the Canada Prairie and Soft White Spring classes" was (and continues to be) to develop cultivars superior in agronomics, quality and disease resistance for production by western Canadian farmers. At the time of project initiation in 1986, HY320 and Fielder were the only eligible varieties for CPS and CWSWS grades, respectively. Although undesirable in several respects, these cultivars continue to predominate the acreages of their respective classes due to the absence of agronomically superior choices.

In 1986, plant selections were made from populations generated by the Saskatchewan Wheat Pool wheat breeding program, forming the basis of the CPS and CWSWS programs. As many of these crosses were made prior to the creation of the CPS class and quality requirements remained uncertain, deficiencies in this breeding material became evident. To meet the main objective of developing superior CPS and CWSWS varieties, crossing programs were initiated with several major goals. Among these goals are improvements in kernel quality, pre-harvest dormancy, common bunt and loose smut resistance, stem and leaf rust resistance and yield/maturity relationship.

Preliminary yield testing of material selected in 1986 began in 1987 and continued in 1988. Several lines with improved agronomics and quality have been identified, but the absence of loose smut and bunt resistance makes registration virtually impossible. Improved lines from crossing programs initiated in 1986 will be yield tested in 1989 with the possibility of registration occurring in 1995.

B. TECHNICAL REPORT

1. Objectives

The primary objective of this program is to develop superior CPS and CWSWS wheat cultivars adapted to the prairie region of western Canada. At the time of project initiation in 1986, HY320 and Fielder were the only cultivars eligible for CPS and CWSWS grades, respectively, and remain the predominantly grown cultivars today. In order to ensure the long term viability of these wheat classes much improvement is necessary. Thus, the major goals of the breeding programs in both classes are:

1) improved kernel quality,
2) improved pre-harvest dormancy,
3) improved rust resistance (Puccinia graminis, P. recondita),
4) improved bunt resistance (Tilletia foetida, T. caries),
5) improved loose smut resistance (Ustilago tritici),
6) improved yield maturity relationship.

2. Experimental Methods

At the initiation of this project in 1986, approximately 200 single plant selections were made from remnant seed of populations generated by the Saskatchewan Wheat Pool wheat breeding program between 1979 and 1985. These crosses were made prior to the creation of the CPS class in 1985, consequently, many of the crosses did not combine all of the characteristics desired. This, in combination with the continued uncertainty of CPS quality requirements necessitated the expansion of early generation breeding materials. Parental material was derived from several sources:

1) lines developed by SWP breeding programs,
2) lines developed by Canadian and U.S. breeding programs,
3) lines processing specific traits from other countries.

During the past 3 years (1986-1988) new crosses were grown either at Saskatoon or at a winter nursery in south-western USA. The F2 segregating populations were subsequently grown at two of three or four locations in Saskatchewan and Manitoba. Head selections were based on visual evaluation of characters such as rust resistance, maturity, height, shattering, lodging, tillering and kernel distinguishability. Following a generation advance at the winter nursery, a single head from each selection was grown as a short row at two locations. Selection of one head per row was based on evaluation of characters observed at F2. Again, these selections were sent to the winter nursery. Harvest of F5 lines at the winter nursery was based on a preliminary quality evaluation (protein and kernel hardness) done on remnant F4 seed. These bulked rows were yield tested (F6) with superior lines advanced for yield testing in following years. Lines having loose smut or bunt resistant parentage were screened for resistance at F7. Full quality evaluation was performed after the second or third year of yield testing. Pure seed used for cooperative testing is derived

from a single F5 plant which is increased and purified for several generations. Table 1 illustrates the advance of breeding material through generations. Progress of the CPS and CWSWS breeding programs is shown in Table 2, which gives the numbers of lines advanced from 1986 to 1988.

Table 1. Advance of Breeding Material from Cross Creation to the Co-operative Testing Stage

	Generation	Action
Year 1	P	cross made in greenhouse or growth room
	F1	grown at winter nursery or growth room
Year 2	F2	spaced at plant populations (2 of 3-4 locations)
	F3	head rows at winter nursery
Year 3	F4	head rows (1 rep,2 locations)-prelim,quality begins
	F5	head rows at winter nursery
Year 4	F6	yield trial, year 1 (2 reps, 2 locations)
Year 5	F7	yield trial, year 2 (4 reps, 2-3 locations)
Year 6	F8	yield trial, year 3 (4 reps, 5-7 locations)
Year 7	F9	co-operative testing ("B" or "C" level)

Table 2. Numbers of CPS and CWSWS Lines Advanced from each generation (1986 - 1988)

	No. of Crosses	Selections					Evaluations		
		F2	F3	F4	F5	F6+	YI	YII	YII
(a) CPS									
1986	85	1626	--	57	74	177	4	0	75
1987	112	1050	--	486	0	17	126	19	20
1988	147	2707	246	436	0	30	333	20	0
(b) CWSWS									
1986	40	--	--	--	--	--	--	--	--
1987	15	657	--	--	--	--	16	1	--
1988	20	406	--	308	--	--	--	--	--

3. Results and Discussion

3.1 Registered Cultivars

OSLO (= PT807, HY925), a cultivar developed by Nickerson American Plant Breeders (NAPB - Agripro) of Berthoud, Colorado was registered in 1987. Saskatchewan Wheat Pool was the NAPB representative in western Canada and initially tested Oslo in 1981 as part of its ongoing cultivar evaluation effort. Oslo is a semi-dwarf, awned wheat with superior CPS quality and Neepawa maturity. although expected to perform well in the northern grain belt, Oslo has not done so. Under conditions of pre-anthesis drought stress, Oslo does not have the yield advantage necessary to generate returns comparable to a CWRS wheat, based on past prices received. Oslo has gained some popularity in the northern grain belt of Manitoba and in the Peace River region of Alberta where early maturity is a primary consideration.

3.2 Lines Submitted for Co-op Testing

3.2.1 Fourth Year Entry

SWP 9521 (= PT806, HY932) is a white-seeded CPS line that yielded 12% more than Neepawa, with similar maturity, based on four years of testing in the Parkland Co-op (1985-1988). The performance of this line in Manitoba and Saskatchewan does not warrant persual of an interim registration for test-marketing purposes. In Alberta, PT806 outyielded Oslo by about 10%. The initial success of HY355 in test marketing may indicate that the significantly harder kernel of PT806 is not desired. This line is also susceptible to common bunt and loose smut, which could cause concern in the registration process. It is unlikely that PT806 will be submitted for interim registration despite its performance in Alberta.

3.2.2 Third Year Entry

NORDIC (= HY931) is a US hard red spring cultivar developed by NAPB-Agripro that meets the CPS quality requirements. Based on three years of Co-op testing, HY931 yielded 4% more than HY320 and matured at the same time. Quality was judged to be much superior to HY320. Leaf and stem rust resistance is very good but this line is susceptible to bunt and loose smut. Due to non-uniform kernel shape, Nordic is not eligible for a CPS registration.

3.2.3. Second Year Entry

SWP 730 (= HY919) is a red-seeded, full season CPS line with improved quality. Based on two years of testing in the HY Co-op (1986, 1987), HY919 yielded 9% less than HY320 but 18% more than Neepawa. This line was not advanced for a third year of testing because of its inferior yield performance and similar quality to HY368, the proposed replacement for HY320.

SWP 9525 (= PT810) is a sister line to SWP 9521 (PT806). This CPS (White) line yielded 8% more than Neepawa and matured two days earlier. PT 810 was characterized by a mixture of CPS and CWSWS kernel types and was thus dropped from further testing.

SWP 9302 (= PT809, HY933) is a CPS (Red) line that yielded 3% more than HY320 in the Parkland Co-op and matured at the same time. Based on two additional years of HY Co-op testing, HY933 yielded 2% less than HY320 but matured two days earlier. This line has a larger kernel than currently registered CPS cultivars and is of better quality than HY320. On the negative side, HY933 is susceptible to common bunt and is somewhat prone to shattering. This line has been entered into the 1989 HY Co-op for a third year of testing.

3.2.4 First Year Entries

SWP 847 (= PT808) is a semi-dwarf, awned utility wheat that yielded 8% more than Glenlea and matured at about the same time. The quality of PT808 was inferior to Glenlea, hence this line was not tested further.

SWP 9249 (= HY929) is a full season CPS (Red) line with improved quality characteristics relative to HY320. This semi-dwarf, awned wheat was first tested in the HY Co-op in 1986 and yielded the same as HY320. Unfortunately, HY929 was characterized by poor weathering tolerance as indicated by low Falling Number Value and high alpha-amylase activity and was thus dropped from further testing.

SWP 9254 (= HY930) yielded 18% less than HY320 and only 5% better than Neepawa in the 1986 HY Co-op. This CPS (Red) line had good quality but inadequate leaf rust resistance and yield potential so it was dropped from further testing.

SWP 2599 (= HY934) is a CPS (Red) line tested in the HY Co-op in 1987. This line yielded 4% less than Neepawa and 14% less than HY320 but matured at the same time as HY320. Quality and rust resistance levels of HY934 were superior to HY320 but based on yield performance this line was dropped from further testing. It appears that superior rust resistance of this line resulted in the yield advantage observed during the 1986 rust epidemic. In the absence of disease pressure, no yield advantage was shown.

3.3 Lines Entered into the "B" Level Co-op

SWP 9255 is a CPS (Red) line that yielded 10% less than HY368 and only 6% more than Neepawa in the 1988 HY "B" Co-op. Maturity was similar to Neepawa. This line was rated as moderately susceptible to loose smut and susceptible to bunt. Although the quality of SWP 9255 is acceptable, it inferior agronomic and disease performance preclude it from further testing.

SWP 9301 is a sister line to SWP 9302 (HY933), a red-seeded CPS line. SWP 9301 yielded 13% less than HY368 but had similar maturity. This line was

rated as highly susceptible to loose smut and susceptible to bunt. Although the quality appeared to be good, this line did not warrant further testing.

3.4 Promising Lines Identified

One white and four red experimental lines with CPS quality were identified in 1988. Three of these lines will be evaluated in 1989 "B" level Co-op tests. Results reported are for six station-years of data (1987, 1988).

SWP 4838 (W15962/HY320) is a white CPS line that yielded 2% less than HY320 but headed three day earlier and matured six days earlier than HY320. SWP 4838 has a slightly smaller kernel than HY320 but has higher protein and a harder kernel. Stem and leaf rust resistance is similar to that of HY320. This line will be submitted to the 1989 Parkland Wheat "B" Co-op test for further testing.

SWP 4943 (Era/2*Protor//HY320) is a red CPS line that yielded the same as HY320 but matured two days earlier. This line has slightly higher protein and is much harder than HY320. Stem and leaf rust resistance is good. SWP 4943 will be submitted to the 1989 High Yielding Wheat "B" Co-op for further evaluation.

SWP 4025 (HY320/6WA644) is a red CPS line that yielded 5% better than HY320 and matured at the same time. Kernel size of this line is larger than HY320 but the test weight is lower. Protein content is similar to HY320 but the kernel is harder. Stem and leaf rust resistance are also similar to HY320 but preliminary testing has indicated much improved bunt resistance. SWP 4025 will be submitted to the High Yielding Wheat "B" level Co-op test in 1989.

SWP 4871 (Era/2*Protor//HY320) is a red CPS line that yielded 2% more than HY320 with similar maturity. This line has also improved CPS quality and good stem and leaf rust resistance. Due to low quantities of purified seed, this line will not be submitted for Co-op testing in 1989.

SWP 4864 (HY320//Nuri/Waldron) is a red CPS line that yielded 4% better than HY320 and matured at about the same time. The quality of this line appears to be good. Stem and leaf rust resistance is acceptable. This line will undergo further testing at SWP sites in 1989.

In addition to the above lines, several white CPS lines (SWP 4963, 4964, 4965, 4971) showed some promise due to their improved sprouting tolerance. Although these lines did not yield as well as HY320, the improved quality and sprouting tolerance warrant further testing in 1989. Unfortunately, these lines are all highly susceptible to common bunt.

4. Conclusions and Impact

During the three years of ERDA/ADF funding, a good base for CPS and CWSWS cultivar development has been established. Lines with improved quality, relative to HY320, are routinely produced, with sprouting resistant, bunt resistant and loose smut resistant lines soon to be yield tested. With quality guidelines for the CPS class now in place, it is only a matter of time before the Saskatchewan Wheat Pool registers a CPS cultivar that meets the needs of the Western Canadian farmer. CWSWS cultivars are sure to follow somewhat later.

5. Extension Activities

Visits to the Saskatchewan Wheat Pool Product Development Farm at Watrous, the main site of our research activities, were as follows:

Year 1 (1986) - Approximately 750 people, of which about two-thirds were Saskatchewan Wheat Pool farmer-members and staff, visited the farm. Additionally, about 50 Canadian and foreign researchers toured the site.

Year 2 (1987) - Approximately 700 people visited the farm, with about 50% being Saskatchewan Wheat Pool farmer-members and staff. About 30 visitors were research scientists and delegates from Canada and abroad. Dr. P. Hucl addressed a meeting of the SWP Product Development Advisory Committee which consists of 16 innovative farmer-members from across Saskatchewan.

Year 3 (1988) - Approximately 800 people visited the farm of which about 50% were Saskatchewan Wheat Pool farmer-members and staff. In addition to the farmer visitations, about 80 researchers and foreign delegates toured the Watrous site.

SELECTION AND EVALUATION OF IMPROVED HIGH YIELDING SPRING WHEATS FOR THE CANADA PRAIRIE AND SOFT WHITE SPRING CLASSES

ERDA PROJECT NO. 1.1 - 11

1988 ANNUAL REPORT

PREPARED BY:

R.J. GRAF
WHEAT BREEDER

SASKATCHEWAN WHEAT POOL
PRODUCT DEVELOPMENT BRANCH

SASKATOON, SASKATCHEWAN

1988 ANNUAL REPORT

1. ERDA PROJECT NO. 1.1 - 11

Selection and evaluation of improved high yielding spring wheats for the Canada Prairie and Soft White Spring classes.

2. PROGRESS REPORT FOR 1988 AS PER APPENDIX "A"

The 1988 growing season was the third and final year during which promising experimental wheat lines were yield tested under the auspicies of this ERDA agreement.

2.1 LINES TESTED IN 1988 CO-OP TRIALS

2.1.1 FOURTH YEAR ENTRY

SWP 9521 (PT 806)

Based on four years of testing in the Parkland Co-op (1985-1988), this CPS-white seeded line yielded 12% more than Neepawa, with similar maturity. The performance of this line in Manitoba and Saskatchewan does not warrant persual of an interim registration for test-marketing purposes. In Alberta, PT 806 consistently outyields Oslo by about 10%. The initial success of HY 355 in test marketing may indicate that the significantly harder kernel of PT 806 is not desired. This line is also susceptible to common bunt and loose smut which could cause concern in the registration process. It is unlikely that PT 806 will be submitted for interim registration.

2.1.2 SECOND YEAR ENTRY

SWP 9302 (HY 933)

Tested as PT 809 in the 1986 Parkland Co-op, this red-seeded, CPS line yielded 2.6% more than HY 320 and matured at the same time. Based on an additional two years of HY Co-op testing, HY 933 yielded 2% less than HY 320 but matured two days earlier. This line has a larger kernel than currently registered CPS cultivars and is of better quality than HY 320. On the negative side, HY 933 is susceptible to common bunt and is somewhat prone to shattering. This line will be entered into the 1989 HY Co-op for a third year of testing.

2.1.3 ENTRIES IN "B" LEVEL CO-OP

SWP 9255

SWP 9255 (CPS-R) yielded 10% less than HY 368 and only 6% more than Neepawa in the 1988 High Yielding Wheat "B" Co-op. Maturity was similar to Neepawa. This

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line was rated as moderately susceptible to loose smut and susceptible to bunt. Quality of this line was acceptable. SWP 9255 will not be advanced for further testing.

SWP 9301

SWP 9301 (CPS-R) yielded 13% less than HY 368 but had similar maturity. This line was rated as highly susceptible to loose smut and susceptible to bunt. Although the quality appeared to be good, this line does not warrant further testing.

2.2 PROMISING LINES IDENTIFIED IN 1988 (SWP YII(K))

One white and four red experimental lines with CPS quality were identified in the SWP YII(K) multi-location trial. Three of these lines will be submitted for evaluation in 1989 "B" level Co-op tests. Results reported are for six station-years of data (1987, 1988).

SWP 4838 (W15962/HY 320)

This white CPS line yielded 2% less than HY 320 but headed three days earlier and matured six days earlier than HY 320. SWP 4838 has a slightly smaller kernel than HY 320 but has higher protein and a harder kernel. Stem and leaf rust resistance is similar to that of HY 320. This line will be submitted to the 1989 Parkland Wheat "B" Co-op test for further testing.

SWP 4943 (Era/2*Protor//HY 320)

SWP 4943 is a red CPS line that yielded the same as HY 320 but matured two days earlier. This line has slightly higher protein and is much harder than HY 320. Stem and leaf rust resistance is good. SWP 4943 will be submitted to the 1989 High Yielding Wheat "B" Co-op for further evaluation.

SWP 4025 (HY 320/6WA644)

SWP 4025 is a red CPS line that yielded 5% better than HY 320 and matured at the same time. Kernel size of this line is larger than HY 320 but the test weight is lower. Protein content is similar to HY 320 but the kernel is harder. Stem and leaf rust resistance are also similar to HY 320 but preliminary testing has indicated much improved bunt resistance. SWP 4025 will be submitted to the High Yielding Wheat "B" level Co-op test in 1989.

SWP 4871 (Era/2*Protor//HY 320)

SWP 4871 is a red CPS line that yielded 2% more than HY 320 with similar maturity. This line also has improved CPS quality and good stem and leaf rust resistance. Due to low quantities of purified seed, this line will not be submitted into a 1989 Co-op test.

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SWP 4864 (HY 320//Nuri/Waldron)

SWP 4864 is a red CPS line that yielded 4% better than HY 320 and matured at about the same time. The quality of this line appears to be good. Stem and leaf rust resistance is acceptable. This line will undergo further testing at SWP sites in 1989.

In addition to the above lines, several white CPS lines (SWP 4963, 4964, 4965, 4971) showed some promise due to their improved sprouting tolerance. Although these lines did not yield as well as HY 320, the improved quality and sprouting tolerance warrant further testing in 1989. Unfortunately, these lines are all highly susceptible to common bunt.

2.3 PRELIMINARY YIELD EVALUATIONS (YI(35)-(50))

In 1988, 333 experimental CPS lines (predominantly F6 generation) were yield tested for the first time. These lines represent crosses made during 1979-1985 which were chosen as potential CPS crosses in early 1986, the first year of this ERDA/ADF contract. No SWS lines underwent yield evaluation in 1988. In 1989, 63 CPS lines will undergo a second year of yield testing based on their agronomic performance and quality evaluation in 1988.

2.4 EARLY GENERATION MATERIAL (F2-F4)

F4

Of the 1707 F2 head selections (1050 CPS, 657 SWS) made in 1987, 394 CPS and 308 SWS lines were harvested as F4 head selections in 1988 (approximately 38% and 47%, respectively). Head rows of these selections are currently being grown at the SWP winter nursery in El Centro, California. Lines with suitable characteristics (hardness, shape, size) will be yield tested in 1989.

F3

Several F3 CPS bulk plots, which have either loose smut or sprouting resistant parentage, were grown at Watrous in 1988. Of the 246 heads selected, 83 were sent to California for seed increase and will be yield tested in 1989. The remaining 163 head selections will be grown as F4 head rows.

F2

The 127 new CPS/SWS crosses initiated during the fall, 1986 and summer, 1987 were represented by 566 F2 plots sown at four locations in 1988. Approximately 2700 F2 head selections were made from the CPS populations of which ca. 1200

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were sent to winter nursery for generation advance. Lines with the appropriate kernel shape will be grown as F4 rows in 1989. The remaining 1500 head selections will be grown as F3 rows. Approximately 400 head selections were taken from the SWS F2 bulk plots and subsequently sent to the winter nursery. As for the CPS program, those lines with suitable kernel characteristics will be grown as F4 rows in 1989.

2.5 NEW BREEDING MATERIAL

In 1988, 147 CPS and 20 SWS populations were generated from our growth room and greenhouse crossing programs. The majority of the new CPS crosses were made with advanced SWP lines and had the following objectives (in order of decreasing importance):

1) improved bunt resistance
2) improved loose smut resistance
3) improved yield/maturity relationship
4) improved sprouting tolerance
5) improved stem and leaf rust resistance

The new SWS crosses were planned with similar objectives in mind.

3. PROJECT EXPENDITURES

Expenditures for the last year of this project are presented in Table 1. Funding obtained from ERDA/ADF accounted for approximately 40% of the project cost in 1988. Many of the costs increased in 1988 due to yield testing of the F2 CPS selections made in 1986, the first year of this project.

4. PERSONNEL

A list of personnel involved in the CPS/SWS breeding project is presented in Table 2. Dr. Pierre Hucl retained the responsiblity of the SWS breeding effort while Dr. Robert Graf took on the CPS program. Mary Tiessen resigned, effective July 22, 1988, and was replaced by Kathy Glatt.

Table 1. Expenditures on the CPS/SWS Wheat Breeding Program

(March 1, 1988 - February 28, 1989)

1.	Salaries	
	(a) Professional	$ 36,887.00
	(b) Technical & Seasonal	41,935.00
2.	Operating Costs and Supplies	2,426.00
3.	Land Rental	1,014.00
4.	Quality Analysis	1,012.50
5.	Travel and Vehicle Maintenance	3,812.89
6.	Alberta and Manitoba Yield Plots	35,683.68
7.	Data Processing	2,339.90
8.	Winter Nursery	6,581.29
9.	Office Overhead	11,416.00
10.	Farm Overhead	28,987.85
11.	Farm Operations	14,393.19
	TOTAL	$186,488.80

Table 2. Personnel and Time Allocated to Project

Personnel	Time Allocation		Position
P. Hucl		15%	Senior Wheat Breeder
R.J. Graf		75%	Wheat Breeder
B. Fowler		18%	Technician III
K. Glatt	(May 1 - February 29, 1989)	40%	Technician III
M. Tiessen	(March 1 - July 22, 1989)	47%	Technician III
G. Pappenfoot	(April 1 - December 31, 1989)	34%	Farm Worker II
C. McLean		35%	Farm Worker II

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SWP Y II (K), 1988 - DATA SUMMARY (VATROUS, OUTLOOK, IRRICANA, ENCHANT).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	TEST WT.	LEAF RUST	BUNT INFECT. (%)	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	FALLING NUMBER	SPROUT (%)
1. Neepawa		R,CWRS	86	50	94	67	32.5	76	10 MR/MS	48*	16.0	108	59	355	40
2. HY 320		R,CPS	100	48	94	60	41.6	77	20 MR/MS		12.8	38	73	268	78
3. Oslo		R,CPS	90	44	89	56	38.6	76	10 MR		13.2	49	70	151	86
4. SWP 9302	BB/3/TZPP/SN.../4/HY 320	R,CPS	99	48	92	58	44.1	78	5 MR	88	13.0	76	64		
5. SWP 4838	W15962/HY 320	W,CPS	101	46	92	59	37.8	77	30 MR/MS	54	13.7	75	65		
6. SWP 4853	VRC 77-5/HY 320	R,CPS	84	46	92	56	40.8	77	30 MR/MS	60	14.1	62	69		
7. SWP 4855	"	R,CPS	73	46	91	55	38.4	77	20 MR/MS	74	14.8	75	65		
8. SWP 4864	HY 320//Nuri/Waldron	R,CPS	104	49	95	61	41.7	79	20 MR/MS	74	13.2	107	57		
9. SWP 4871	Era/2* Protor//HY 320	R,CPS	97	48	95	65	42.1	75	20 MR	84	13.8	61	68		
10. SWP 4910	HY 320/6WA644	R,CPS	95	48	94	59	42.4	76	40 MR	72	12.9	79	64		
11. SWP 4911	HY 320/6WA644	R,CPS	99	48	94	60	43.8	76	10 MR	62	12.5	72	65		
12. SWP 4924	CNO/SN/ /TZPP/.../HY 320	R,CPS	96	48	94	68	45.5	77	20 MR/MS	54	13.2	89	61		
13. SWP 4943	Era/2* Protor//HY 320	R,CPS	98	47	92	58	43.3	78	5 MR	78	13.4	87	62		
14. SWP 4944	"	R,CPS	91	48	93	63	41.9	77	10 MR	76	13.6	86	62		
15. SWP 4951	"	R,CPS	95	47	94	60	43.5	77	10 MR	90	13.4	82	63		
16. SWP 4963	NO66/BB/.../RL 4137	W,CPS	94	48	94	62	41.4	77	5 MR	62	14.6	89	62	156	50
17. SWP 4964	"	W,CPS	86	47	90	59	41.8	76	40 MS	92	14.4	85	61	144	36
18. SWP 4965	"	W,CPS	89	47	93	59	40.9	76	20 MR/MS	90	14.2	89	62	146	42
19. SWP 4970	"	W,CPS	90	46	89	60	39.2	76	20 MR/MS	92	14.0	90	62	175	89
20. SWP 4971	"	W,CPS	90	47	91	64	42.0	76	20 MR/MS	80	13.9	87	61	167	56
21. SWP 4972	NO66/BB/.../RL 4137	W,CPS	90	47	90	58	42.4	75	20 MR/MS	72	14.2	82	63	188	72
22. SWP 4025	HY 320/6WA644	R,CPS	101	49	93	59	43.1	76	20 MR/MS	76	12.7	70	64		
23. SWP Maya		LR,CPS	93	48	91	60	37.5	78	5 MR	34	14.6	81	63		
24. SWP Vireo "S"		W,CPS	102	49	96	63	40.3	76	10 R-MR	12	13.6	73	65		

SWP Y I (35), 1988 - DATA SUMMARY (KUPAWIN, OUTLOOK).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	SHATT. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	85	46	90	77	37.4	1	MR		16.2	115	56	1.6	640	41.8	669	
2. HY 320		R,CPRS	100	45	90	63	44.5	1	MR-MS		13.7	53	68	2.6	600	40.6	263	
3. Oslo		R,CPS	93	42	86	58	41.4	1	MR		14.5	71	65	2.3	580	48.7	425	
4. SWP 5600	HY 912/HY 320	R,CPS	74	42	88	63		1	MS								300	
5. SWP 5601	"	LR,CPS	84	46	89	67		1	MR-MS								362	
6. SWP 5602	HY 912/HY 320	R,CPS	54	46	96	64		1	MR								513	
7. SWP 5603	"	R,CPS	94	50	96	72		1	MR								653	
8. SWP 5604	"	R,MIX	68	56	103	79		1	MR								898	NR,VRN
9. SWP 5605	"	R,MIX	55	54	99	68		1	MR								376	NR,VRN
10. SWP 5606	"	R,CRS	85	47	93	66		1	MR-MS								310	SVRN
11. SWP 5607	HY 912/HY 320	R,MIX	81	42	87	62	41.2	1	MS		14.4	101	59	2.4	600	44.5	352	
12. SWP 5608	"	LR,MIX?	88	56	99	69		1	MR								685	NR,VRN
13. SWP 5609	"	LR,MIX?	98	47	90	68	41.4	1	MR		13.7	101	57	1.8	625	36.6	502	
14. SWP 5610	"	R,CPS	85	44	91	59	43.3	1	MS		13.8	87	61	2.9	590	47.3	?	SVRN
15. SWP 5611	"	R,CPS	90	54	99	76		1	MS								441	VRN
16. SWP 5612	HY 912/HY 320	R,CPS?	97	51	95	74	40.5	1	MR-MS		13.6	75	63	2.1	610	34.3	370	VRN
17. SWP 5613	"	R,CPS	80	43	90	56		1	MR-MS								729	
18. SWP 5614	"	R,CPS	87	43	89	55	43.6	1	MR-MS		14.6	98	61	1.8	610	44.5	767	
19. SWP 5615	"	R,CPS	62	44	93	65		1	MS								637	NR,XVRN
20. SWP 5616	"	R,CPS	96	45	90	62	43.0	1	MR		13.6	91	60	1.9	600	38.2	534	VRN
21. SWP 5617	HY 912/HY 320	R,CPS/U	57	48	97	69		1	MS								341	NR,VRN
22. SWP 5618	"	R,CPS	93	47	92	65	36.1	1	MS		12.8	61	66	1.9	520	29.9	728	
23. SWP 5619	HY 320/QT 8132	R,MIX	85	44	90	65	42.4	1	MR		15.2	76	64	2.4	680	45.3	548	
24. SWP 5620	"	R,MIX	99	48	93	68		1	MR								449	NR,VRN
HY 320 = 1510 g/plot Locations:			2	2	OTL	2	2				3	3	3					

SWP Y I (36), 1988 - DATA SUMMARY (NIPAWIN, OUTLOOK).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	SHATT. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIDOGRAPH MPKT	MIDOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	93	46	91	81	36.7	1	MR		16.0	114	53	1.5	650	45.3	722	
2. HY 320		R,CPS	100	46	92	67	43.8	1	MR-MS		12.8	48	71	2.0	650	35.9	378	
3. Oslo		R,CPS	95	42	92	58	38.9.	1	MR		13.5	90	67	1.8	630	46.7	536	
4. SWP 5621	HY 320/QT 8132	LR,CPS	102	49	96	73		1	MR								589	VRN
5. SWP 5622	"	R,CPS	103	51	94	69		1	R-MR								942	NR,SVRN
6. SWP 5623	HY 320/QT 8132	R,CPS	74	48	93	68		3.5	MR								212	SVRN
7. SWP 5624	SWP 9520/SWP 780191	R,CPS	74	46	91	64		1	MR								440	
8. SWP 5625	"	LR,CPS	91	45	90	70		1	MR								462	
9. SWP 5626	"	LR,CPS	98	47	94	57	38.4	1	MR		1.27	82	62	2.0	630	41.4	602	
10. SWP 5627	"	LR,MIX	81	43	88	69		1	MS								198	
11. SWP 5628	SWP 9520/SWP 780191	LR,CPS	67	46	91	53		3.5	MR								172	
12. SWP 5629	SWP 780191/SWP 9520	R,CPS	59	46	90	71		5	MR-MS								49	
13. SWP 5630	"	R,CPS	88	46	91	68	41.1	1	R-MR		13.9	86	60	1.9	680	46.5	310	
14. SWP 5631	"	LR,CPS	62	45	90	70		5	MR-MS								739m	
15. SWP 5632	"	LR,CPS	64	45	92	69		4.5	MR-MS								228	
16. SWP 5633	SWP 780191/SWP 9520	R,CPS	72	46	91	67		5	MR								121	
17. SWP 5634	"	R,CPS	85	45	89	69		1	R-MR								607	
18. SWP 5635	"	R,CPS	71	46	91	68		5	R-MR								113	
19. SWP 5636	"	R,CPS	88	45	90	65	40.1	3.5	MR		14.6	72	63	1.8	730	46.9	417	
20. SWP 5637	"	R,CPS	73	42	87	68		3	MR								441	
21. SWP 5638	SWP 780191/SWP 9520	R,CPS	53	42	88	72		4.5	MS								163	
22. SWP 5639	"	LR,CPS	52	42	88	70		5	MR-MS								209	
23. SWP 5640	SWP 780191/SWP 912	R,CPS/U	72	46	91	69		5	MS								78	
24. SWP 5641	"	R,CPS	90	45	94	64		3	MS								184	
HY 320 = 1430 g/plot																		
Locations:			2	2	OTL	2	2				2	2	2					

SWP Y I (37), 1988 - DATA SUMMARY (KIPAWIN, OUTLOOK).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	SHATT. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	80	47	91	77	35.2	2	MR		15.4	96	59	1.8	670	35.1	688	
2. HY 320		R,CPS	100	45	91	66	41.6	1	MR-MS		13.2	48	69	2.3	670	31.9	660	
3. Oslo		R,CPS	93	42	89	59	38.3	1	MR-MS		14.1	55	68	1.9	640	47.3	580	
4. SWP 5642	SWP 780191/HY 912	R,CPS	64	45	89	69		5	MS								94	
5. SWP 5643	"	R,CPS	72	46	91	66		4	MR-MS								108	
6. SWP 5644	SWP 780191/HY 912	R,CPS	81	45	93	65	40.6	2	MS		12.6	58	68	1.7	625	33.1	515	
7. SWP 5645	HY 320/SUW 79	R,CPS	92	48	93	69	38.1	1	MR-MS		13.1	86	62	1.9	640	31.1	976	
8. SWP 5646	"	R,CPS/U	79	52	95	77		1	MR								481	NR,VRN
9. SWP 5647	"	R,CPS	92	51	96	73		1	MR								759	
10. SWP 5648	"	R,CPS	87	49	95	75		1	MR-MS								333	
11. SWP 5649	HY 320/SUW 79	R,CPS	85	50	95	72		1	MR								345	
12. SWP 5650	"	LR,CPS	72	46	91	64		1	MS								1348m	NR,S.SPIKES
13. SWP 5651	HY 320/OXLEY	R,CPS	69	47	90	77		1	MS								191	
14. SWP 5652	"	LR,CPS	57	51	98	76		1	MR								128	VRN
15. SWP 5653	"	R,CPS	65	55	99	67		1	MR-MS								768	VRN
16. SWP 5654	K 321/SUW 797-1	R,CPS	87	53	97	78		1	R-MR								374	VRN
17. SWP 5655	HY 320/OXLEY	R,CPS	79	46	94	72	37.8	1	MS		13.3	71	64	2.2	740	35.5	695	VRN
18. SWP 5656	"	R,CPS	82	48	95	71	36.8	1	MR-MS		13.8	68	65	2.1	770	34.7	487	SVRN
19. SWP 5657	"	R,CPS	87	50	97	75	37.2	1	MR		13.1	68	65	1.9	675	31.5	787	VRN
20. SWP 5658	"	LR,CPS	82	50	97	75	37.2	1	MS								548	VRN
21. SWP 5659	HY 320/OXLEY	R,CPS	83	49	94	70	36.9	1	MR-MS		13.3	71	63	1.8	690	29.6	621	VRN
22. SWP 5660	"	R,CPS	81	48	95	67	36.2	1	MR-MS		13.5	73	64	2.5	685	33.9	601	VRN
23. SWP 5661	"	R,CPS	83	48	95	72		1	MR-MS								684	SVRN
24. SWP 5662	"	R,CPS	95	50	96	79		1	MR								517	VRN
HY 320 = 1518 g/plot Locations:			2	2	OTL	2	2				3	3	3					

SWP Y I (38), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGATED).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	TEST (WT.)	SHATT. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS MIRI	K. HARDNESS PSI	MIXOGRAPH MPRT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	84	79	101	87	35.7	73	1	MR		14.9	104	56	1.3	600	38.6	717	
2. HY 320		R,CPS	100	53	100	69	41.0	75	1	MR		12.3	41	72	2.0	550	31.5	604	
3. Oslo		R,CPS	103	48	96	65	37.7	75	1	MR-MS		13.1	58	67	1.7	530	46.9	623	
4. SWP 5663	HY 320/ND 50	R,CPS	77	51	101	59	38.2	74	1	MS								705	VRN
5. SWP 5664	906 R/S 41529	R,CPS	87	53	102	72	40.1	70	1	MR								233	
6. SWP 5665	906 R/S 41529	R,CPS	94	50	98	75	43.8	75	1	MS								828	
7. SWP 5666	HY 320/6WA693	R,CPS	113	54	99	75	39.4	76	1	R-MR		13.5	73	65	1.9	490	32.7	813	
8. SWP 5667	"	R,CPS	87	56	102	69	39.8	74	1	R-MR								433	
9. SWP 5668	"	R,CPS?	89	59	103	79	36.9	67	1	MR								361	
10. SWP 5669	"	R,CPS	92	56	98	74	41.7	72	1	R-MR								333	
11. SWP 5670	HY 320/6WA693	R,CPS/U	97	56	103	77	42.5	73	1	MR								250	
12. SWP 5671	"	R,CPS	87	60	106	78	36.8	71	1	MR								?	NR,VRN
13. SWP 5672	"	R,CPS/U	88	58	105	91	38.9	70	3.5	—								493	NR,SVRN
14. SWP 5673	"	R,CPS	96	57	103	71	37.0	71	1	R-MR								634	NR,SVRN
15. SWP 5674	"	R,CPS/U	82	59	104	84	40.2	71	3.5	R-MR								221	NR,VRN
16. SWP 5675	HY 320/6WA693	R,CPS	77	48	98	63	40.8	74	1	MR-MS								542	S.SPIKES
17. SWP 5676	"	LR,CPS	111	57	103	79	40.3	74	1	—		12.5	25	75				753	SOFT
18. SWP 5677	"	R,CPS?	84	49	99	71	41.4	75	1	MR								597	
19. SWP 5678	"	R,CPS	87	56	103	75	39.0	72	1	S								564	
20. SWP 5679	"	R,CPS/U	98	55	102	69	45.1	70	1	MR		13.4	75	63	1.5	650	28.4	438	
21. SWP 5680	HY 320/6WA693	R,MIX	87	57	105	76	36.8	71	1	—								609	NR,VRN
22. SWP 5681	"	R,MIX	85	57	104	74	36.1	74	1	MS								647	NR,VRN
23. SWP 5682	6WA693/HY 320	LR,CPS	91	59	104	87	35.8	69	1	R-MR								382	NR,VRN
24. SWP 5683	"	R,CPS	83	53	101	69	39.9	73	1	R-MR								228	
HY 320 = 1758 g/plot																			
Locations:			2	2	2	2	2	IRR				3	3	3					

SWP Y I (39), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGATED).

	ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	SPIKE MOIST. (%)	HEIGHT (CM)	1000K (G)	TEST WT	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS MIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1.	Columbus		R,CWRS	81	55	111	52	93	31.5	74	1	-		15.1	108	58	1.9	660	34.7	608	
2.	HY 320		R,CPS	100	53	111	45	75	38.1	76	1	MR-MS		12.4	41	71	2.5	640	31.1	500	
3.	Oslo		R,CPS	91	48	105	44	65	32.3	75	1	MR-MS		13.0	53	67	2.4	600	43.3	541	
4.	SWP 5684	6WA693/HY 320	R,MIX	104	60	112	51	72	(37.2)	71	1	MR-MS								812	NR,VRN
5.	SWP 5685	"	R,CPS	97	54	112	48	70	40.6	72	1	MR		14.5	73	65	2.2	710	37.0	502	
6.	SWP 5686	6WA693/HY 320	R,CPS	108	60	112	52	77	(39.2)	74	1	MR								1218	VRN
7.	SWP 5687	"	R,CPS	105	59	110	50	73	39.6	75	1	R-MR		12.9	87	60	0.9	550	25.6	809	
8.	SWP 5688	"	R,CPS	94	59	111	52	73	(39.8)	72	1	MR								255	VRN
9.	SWP 5689	"	R,MIX	85	62	114	54	79	(31.2)	67	1	-								665	NR,SVRN
10.	SWP 5690	"	R,CPS	98	59	110	51	65	(38.4)	74	1	R-MR								455	NR,SVRN
11.	SWP 5691	6WA693/HY 320	R,CPS	105	54	107	43	71	37.9	77	1	MR		13.4	65	64	2.4	620	32.3	445	
12.	SWP 5692	"	R,CPS	103	53	108	45	68	35.0	76	1	MR-MS		12.5	30	74				653	SOFT
13.	SWP 5693	"	R,CPS	78	52	113	38	76	(34.6)	73	4	-								295	VRN
14.	SWP 5694	"	R,CPS	96	60	113	52	78	(39.8)	72	1	MR-MS								800	NR,SVRN
15.	SWP 5695	"	R,CPS	95	57	111	47	78	41.0	74	1	MR		14.1	72	66	2.0	665	34.7	212	
16.	SWP 5696	6WA693/HY 320	R,CPS	97	55	109	44	68	34.6	74	1	MS		14.0	67	65	2.2	590	35.5	570	
17.	SWP 5697	"	R,CPS	100	59	111	53	69	(43.2)	79	1	MR								729	VRN
18.	SWP 5698	"	R,CPS	95	61	112	50	75	(39.2)	74	1	MR								675	NR,SVRN
19.	SWP 5699	"	R,CPS	93	49	107	38	63	38.7	75	1	MR-MS		12.7	91	60	3.0	520	36.6	697	
20.	SWP 5700	"	R,CPS	91	47	105	37	67	38.4	76	1	MR-MS		13.3	44	71	1.4	540	27.6	611	
21.	SWP 5701	6WA693/HY 320	R,CPS	93	62	112	56	70	(40.8)	70	1	R-MR								427	NR,VRN
22.	SWP 5702	"	R,CPS	82	61	114	53	80	(34.8)	72	1	MS								888	NR,SVRN
23.	SWP 5703	"	R,CPS	93	62	112	53	76	(40.8)	74	1	MS								709	NR,SVRN
24.	SWP 5704	"	R,CPS	87	62	114	52	77	(36.8)	73	1	MS								340	NR,SVRN
HY 320 = 1436 g/plot Locations:				2	2	IRR	2		2(IRR)	IRR				3	3	3					

SWP Y I (40), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGATED).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	SPIKE MOIST. (%)	HEIGHT (CM)	1000K (G)	TEST WT	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPRT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CMRS	78	54	108	47	83	33.3	75	1	MR		14.5	103	59	1.5	590	35.9	652	
2. HY 320		R,CPS	100	52	109	44	71	37.8	76	1	MR-MS		12.3	46	70	2.4	550	28.8	472	
3. Oslo		R,CPS	90	47	105	38	72	33.7	76	1	MR-MS		13.3	61	67	2.0	580	43.3	506	
4. SWP 5705	6WA693/HY 320	R,CPS	95	59	112	51	69	(41.4)	74	1	MR-MS								715	SVRN
5. SWP 5706	"	R,CPS	91	55	108	47	83	36.3	74	1	MS		13.3	87	61	1.9	560	29.9	498	
6. SWP 5707	6WA693/HY 320	R,CPS	103	54	109	43	76	37.0	76	1	R-MR		12.3	73	65	1.5	485	21.7	951	
7. SWP 5708	HY 320/6WA644	R,MIX	91	53	107	43	72	34.9	75	1	MS		13.1	81	60	2.0	550	32.7	815	
8. SWP 5709	"	R,CPS	101	55	109	47	71	35.7	76	1	MR-MS		12.6	83	61	2.0	550	30.7	858	SVRN
9. SWP 5710	"	R,CPS	106	57	109	46	73	38.0	73	1	MR-MS		12.3	65	65	2.0	610	28.4	428	
10. SWP 5711	"	R,CPS?	97	56	107	48	70	38.6	75	1	MR		13.0	75	65	2.2	640	32.7	449	
11. SWP 5712	HY 320/6WA644	R,CPS	99	58	109	50	73	(38.6)	72	1	R-MR								369	NR,SVRN
12. SWP 5713	"	R,CPS	100	55	110	48	74	35.5	74	1	MR-MS		12.1	71	64	1.8	530	30.7	676	
13. SWP 5714	"	R,CPS	102	56	109	50	77	36.4	76	1	R-MR		13.3	81	62	2.0	560	39.4	725	PRS
14. SWP 5715	"	R,MIX	78	63	116	53	74	(5.8)	67	1	R-MR								595	NR,VRN
15. SWP 5716	"	R,CPS	82	51	113	50	75	(35.0)	68	1	MR								463	VRN
16. SWP 5717	HY 320/6WA644	R,CPS	105	57	111	51	72	(39.6)	74	1	MR								431	VRN
17. SWP 5718	"	R,CPS	98	60	111	51	72	(40.8)	75	1	MR								638	SVRN
18. SWP 5719	"	R,CPS	105	58	111	47	68	(41.8)	74	1	MR-MS								599	
19. SWP 5720	"	R,CPS	102	59	110	51	65	(40.6)	75	1	R-MR								704	
20. SWP 5721	"	R,MIX	77	64	113	55	82	(35.8)	70	1	MR								803	NR,VRN
21. SWP 5722	HY 320/6WA644	R,CPS	102	56	110	51	75	36.2	76	1	MR		(12.4)	(77)	(64)	2.2	520	30.7	669	
22. SWP 5723	"	R,CPS	87	48	107	38	70	(37.6)	76	1	MR-MS								617	
23. SWP 5724	"	R,CPS	86	48	109	43	70	39.2	74	1	MR		(12.9)	(63)	(68)	2.2	560	31.9	316	
24. SWP 5725	"	R,CPS	102	57	111	48	72	(41.6)	73	1	MR								382	
HY 320 g/plot																				
Locations:			2	2	IRR	NB	2	2(IRR)	IRR				3(2)	3(2)	3(2)					

SWP Y I (41), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGANA).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	SPIKE MOIST. (%)	HEIGHT (CM)	1000K (G)	TEST WT	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTKIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	68	52	107	47	93	33.1	75	1	MR-MS		14.1	90	59	1.7	630	33.9	720	
2. HY 320		R,CPS	100	52	107	42	67	36.7	76	1	MR-MS		11.5	53	69	2.2	570	28.4	592	
3. Oslo		R,CPS	81	46	104	38	65	33.9	76	1	MR-MS		12.5	59	67	2.3	600	46.1	623	
4. SWP 5726	HY 320/6WA644	R,CPS	98	58	110	48	73	(40.6)	75	1	MR-MS								840	NR,SVRN
5. SWP 5727	"	R,CPS	96	56	109	45	73	(42.4)	75	1	MR-MS								608	
6. SWP 5728	HY 320/6WA644	R,CPS	88	57	108	45	69	(43.0)	74	1	MS								1089	NR,SVRN
7. SWP 5729	"	R,CPS	86	58	109	46	68	(41.0)	77	1	MR								1252	NR,SVRN
8. SWP 5730	"	R,CPS	98	55	108	45	74	38.0	76	1	MS		12.5	84	59	2.3	560	28.4	912	
9. SWP 5731	"	R,CPS	94	57	110	49	68	(38.4)	75	1	MR								501	NR,PRS
10. SWP 5732	"	R,CPS	98	57	108	47	68	(40.6)	73	1	MS								505	
11. SWP 5733	HY 320/6WA644	R,CPS	91	61	112	51	65	(40.8)	75	1	MR								491	NR,VRN
12. SWP 5734	"	R,CPS	93	59	109	49	72	(41.2)	75	1	MR								521	NR,PRS
13. SWP 5735	"	R,CPS	88	60	112	50	70	(43.4)	73	1	R-MR								258	NR,PRS
14. SWP 5736	"	R,CPS	96	56	109	47	61	(38.4)	74	1	MR								485	PRS
15. SWP 5737	"	R,CPS	97	56	109	47	59	(38.4)	74	1	MR								427	
16. SWP 5738	HY 320/6WA644	R,MIX	99	57	109	49	60	(38.6)	74	1	MR								502	PRS
17. SWP 5739	"	R,CPS	100	59	109	49	65	(39.2)	73	1	MR								720	SVRN
18. SWP 5740	"	R,CPS/U	70	48	101	33	69	(42.8)	75	3	MR-MS								184	
19. SWP 5741	"	R,CPS	97	57	108	45	75	(42.0)	75	1	MS								924	
20. SWP 5742	"	R,CPS	84	54	107	35	76	(42.8)	76	3.5	MR								153	
21. SWP 5743	HY 320/5743	R,CPS	105	58	109	48	75	37.4	76	1	R-MR		12.1	86	61	2.1	560	27.6	805	NR,SVRN
22. SWP 5744	"	R,CPS	97	54	109	43	75	36.5	76	1	MR-MS		12.5	78	63	2.3	550	30.7	663	
23. SWP 5745	"	R,CPS	88	57	109	44	71	(39.8)	76	1	MR-MS								1135	
24. SWP 5746	"	R,CPS	92	56	109	45	69	36.4	74	1	MS		12.8	86	60	2.0	570	28.8	474	
HY 320 = 1825 g/plot																				
Locations:			2	2	IRR	NB	2	2(IRR)	IRR				3	3	3					

SWP Y I (42), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGATED).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	SPIKE MOIST. (%)	HEIGHT (CM)	1000K (G)	TEST WT	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	64	52	108	42	89	32.8	76	1	MR		15.2	101	57	1.5	600	34.7	797	
2. HY 320		R,CPS	100	51	106	40	71	36.4	77	1	MR-MS		11.7	44	71	2.2	610	28.0	586	
3. Oslo		R,CPS	82	46	104	31	65	34.9	76	1	MR		12.7	55	68	2.2	580	42.6	642	
4. SWP 5747	HY 320/6WA644	R,CPS	101	55	110	47	71	(42.6)	74	1	MR-MS								913	NR,SVRN
5. SWP 5748	"	R,CPS	90	58	111	48	69	(41.2)	73	1	MR-MS								766	SVRN
6. SWP 5749	6WA644/HY 320	R,CPS	102	57	110	49	72	(42.0)	73	1	MR								519	PRS
7. SWP 5750	"	R,CPS	97	56	111	48	72	(43.4)	73	1	R-MR								772	VRN
8. SWP 5751	"	R,CPS	96	57	110	47	72	(43.2)	74	1	MR-MS								419	
9. SWP 5752	"	R,CPS	100	54	111	42	76	38.7	72	3.5	R-MR		12.5	30	73				227	SOFT
10. SWP 5753	"	R,CPS	105	55	107	49	69	33.5	74	1	MR		12.3	71	67	1.6	540	22.1	802	SVRN
11. SWP 5754	6WA644/HY 320	R,CPS	94	59	110	49	73	(41.6)	75	1	R-MR								526	NR,SVRN
12. SWP 5755	"	R,CPS	96	59	112	51	75	(38.8)	72	1	MR								641	VRN
13. SWP 5756	"	R,MIX	84	58	111	48	78	(40.6)	72	1	MR								406	
14. SWP 5757	"	R,CPS	75	48	106	30	72	37.6	77	1	MR		12.4	66	66	2.4	580	37.8	599	
15. SWP 5758	"	R,CPS?	94	59	111	50	76	(38.8)	75	1	R-MR								792	NR,SVRN
16. SWP 5759	6WA644/HY 320	R,CPS	97	56	110	43	66	34.7	72	1	MR		12.5	72	64	1.8	575	24.0	1096	
17. SWP 5760	"	R,CPS	100	58	110	47	70	(43.2)	74	1	MR-MS								1015	
18. SWP 5761	"	R,CPS	109	57	111	45	66	(44.6)	72	1	MR								356	NR,VRN
19. SWP 5762	"	R,CPS	96	54	101	43	77	35.5	75	1	R-MR		12.6	66	68	2.9	610	34.7	565	
20. SWP 5763	"	R,CPS	87	60	110	50	66	(40.0)	76	1	MR								818	SVRN
21. SWP 5764	6WA644/HY 320	R,MIX	106	51	108	42	66	38.1	78	1	MR		13.0	75	62	2.0	590	31.1	881	
22. SWP 5765	"	R,CPS	89	60	112	51	75	(41.6)73	73	1	R-MR								771	SVRN
23. SWP 5766	"	R,CPS	102	58	111	49	76	(43.8)	76	1	R								919	
24. SWP 5767	"	R,CPS	75	47	105	33	63	(40.4)	77	5	MR-MS								147	
HY 320 = 1594 g/plot																				
Locations:			2	2	IRR	NB	2	2(IRR)	IRR				3	3	3					

SWP Y I (43), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGATED).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	SPIKE MOIST. (%)	HEIGHT (CM)	1000K (G)	TEST WT	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	72	52	108	34	92	33.0	74	1	MR		13.8	109	57	1.6	650	33.9	711	
2. HY 320		R,CPS	100	52	107	36	69	36.8	75	1	MR-MS		11.8	53	70	2.0	600	28.0	818	
3. Oslo		R,CPS	90	45	104	23	69	34.8	75	1	MR-MS		12.8	58	67	1.9	610	38.6	803	
4. SWP 5768	6WA644/HY 320	R,MIX	64	51	108	41	81	(37.6)	72	1	MR								346	SVRN
5. SWP 5769	"	R,CPS	99	57	112	44	74	(39.0)	73	1	R-MR								647	SVRN
6. SWP 5770	6WA644/HY 320	R,CPS	86	56	111	39	72	(43.6)	73	1	MR								675	
7. SWP 5771	"	R,MIX	64	48	105	26	64	(40.4)	75	1	S								380	
8. SWP 5772	"	R,CPS	69	48	105	23	60	(40.2)	75	1	S								533	
9. SWP 5773	"	R,CPS	107	57	109	42	77	36.2	74	1	MS		13.9	105	57	1.2	600	17.7	655	PRS
10. SWP 5774	"	R,CPS	103	56	108	44	77	(43.4)	73	1	R-MR								632	NR,SVRN
11. SWP 5775	6WA644/HY 320	R,CPS	93	50	107	36	77	35.9	76	1	R-MR		13.1	100	61	1.5	530	24.8	418	
12. SWP 5776	"	R,CPS	101	56	112	42	70	(40.6)	75	1	MR								1208	NR,PRS
13. SWP 5777	"	R,MIX	85	55	115	43	75	(41.2)	75	1	MR								638	
14. SWP 5778	"	R,CPS	87	58	112	45	71	(37.0)	71	1	MR-MS								863	NR,SVRN
15. SWP 5779	"	R,CPS?	97	59	110	46	73	(38.8)	73	1	R-MR								1078	
16. SWP 5780	6WA644/HY 320	R,CPS	89	55	107	38	70	(38.2)	73	1	R-MR								409	
17. SWP 5781	"	R,MIX	85	49	107	28	62	(39.6)	76	1	MR-MS								610	
18. SWP 5782	"	R,MIX	81	48	105	22	65	(41.0)	73	1	MS								1351	NR
19. SWP 5783	"	R,CPS	80	54	108	38	75	(40.6)	73	1	MR-MS								312	
20. SWP 5784	"	R,CPS	91	59	111	46	79	(37.8)	73	1	R-MR								501	SVRN
21. SWP 5785	6WA644/HY 320	R,CPS	63	50	109	38	64	(42.0)	73	1	MR-MS								124	
22. SWP 5786	"	R,CPS	86	48	105	21	62	(37.2)	75	1	MS-S								732	
23. SWP 5787	"	R,MIX	81	56	110	44	70	(39.0)	74	1	MR								810	
24. SWP 5788	"	R,MIX	87	59	110	45	81	(39.8)	71	1	MR								792	
HY 320 = 1683 g/plot																				
Locations:			2	2	IRR	NS	2	2(IRR)	IRR				3	3	3					

SWP Y I (44), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGATED).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	SPIKE MOIST. (%)	HEIGHT (CM)	1000K (G)	TEST WT	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS KURI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	82	54	109	32	89	33.3	73	1	MR		14.8	110	57	1.6	600	35.5	798	
2. HY 320		R,CPS	100	53	109	28	68	35.9	72	1	MS		12.5	56	67	1.9	600	29.2	676	
3. Oslo		R,CPS	84	48	105	19	62	33.7	73	1	MR-MS		13.0	64	67	1.8	600	42.6	725	
4. SWP 5789	6VA644/HY 320	R,MIX	66	48	106	17	74	(43.8)	73	4.5	MR								133	
5. SWP 5790	"	R,CPS	86	48	107	19	61	(39.4)	77	1	MR								819	
6. SWP 5791	6VA644/HY 320	R,CPS	98	57	108	39	74	(39.0)	72	1	R-MR								621	
7. SWP 5792	"	R,CPS	69	47	104	21	65	(41.4)	77	1	MR-MS								387	
8. SWP 5793	"	R,CPS	75	48	111	15	72	(39.4)	72	3.5	MR								343	
9. SWP 5794	"	R,CPS	82	48	105	19	69	(46.4)	73	1	MR								242	
10. SWP 5795	"	R,CPS	99	57	112	35	72	(40.2)	70	1	MR								542	
11. SWP 5796	6VA644/HY 320	R,CPS	88	55	108	35	67	35.1	71	1	MR-MS		14.2	87	61	2.3	680	38.2	379	
12. SWP 5797	HY 3. /908 R	R,CPS	79	61	111	47	68	(35.6)	70	1	MS								1402	NR,VRN
13. SWP 5798	"	R,CPS	69	53	110	33	71	(39.2)	72	1	MS								320	
14. SWP 5799	"	R,MIX	83	59	111	38	78	(40.8)	69	1	MS								844	NR,VRN
15. SWP 5800	"	R,CPS	100	58	111	38	78	(40.0)	70	1	MS								252	
16. SWP 5801	15-61/HY 320	R,CPS	91	55	109	30	84	(38.2)	74	1	MR								541	
17. SWP 5802	"	R,CPS	100	55	108	28	74	36.7	76	1	MS		13.4	110	57	3.0	590	37.8	309	
18. SWP 5803	"	R,CPS	99	54	111	25	76	36.8	74	1	MS		12.9	97	59	1.6	500	29.2	768	
19. SWP 5804	"	R,CPS	85	52	106	22	81	(44.2)	78	1	MS								647	
20. SWP 5805	"	R,CPS	95	56	109	35	73	(40.6)	75	1	MR-MS								968	SVRN
21. SWP 5806	15-61/HY 320	R,CPS	90	52	109	31	73	36.9	76	1	MR-MS		13.5	88	62	1.8	660	39.8	461	
22. SWP 5807	"	R,CPS	94	54	107	31	79	(40.8)	75	1	MS								682	
23. SWP 5808	"	R,CPS	95	51	108	26	86	39.0	75	1	MR		12.5	58	68	2.0	550	33.9	471	
24. SWP 5809	HY 320/WRC 77-5	R,CPS	98	55	112	32	71	(38.0)	69	3	MS								441	
HY 320 = 1633 g/plot																				
Locations:			2	2	IRR	NB	2	2(IRR)	IRR				3	3	3					

SWP Y I (45), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGATED).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	SPIKE MOIST. (%)	HEIGHT (CM)	1000K (G)	TEST WT	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPRT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	90	53	110	30	70	32.9	70	1	MR		14.6	106	57	1.5	610	32.7	799	
2. HY 320		R,CPS	100	51	104	27	67	38.1	72	1	MS		11.7	51	69	1.8	600	31.5	767	
3. Oslo		R,CPS	88	48	105	20	65	34.2	74	1	MR-MS		12.1	66	64	1.8	600	38.6	735	
4. SWP 5810	HY 320/WRC 77-5	R,CPS	82	48	108	18	66	(42.5)	74	3.5	MS								539	
5. SWP 5811	"	R,CPS	114	60	112	43	74	(37.8)	72	1	MR								1408	NR,SVRN
6. SWP 5812	HY 320/WRC 77-5	R,CPS	91	49	105	21	70	(41.4)	76	1	MS								757	
7. SWP 5813	"	R,CPS	76	52	109	24	78	(45.6)	75	1	MS								157	
8. SWP 5814	"	R,CPS	66	59	113	36	81	(38.4)	66	1	MR-MS								265	PRS
9. SWP 5815	WRC 77-5/HY 320	R,CPS	70	50	110	34	70	(36.4)	69	1	MR-MS								488	
10. SWP 5816	"	R,CPS	95	56	112	26	76	(37.6)	71	1	MR-MS								472	NR
11. SWP 5817	PROSPUR/HY 320	R,CPS	97	63	115	45	79	(36.0)	68	1	MR								1176	NR,SVRN
12. SWP 5818	"	R,CPS	101	61	112	46	73	(37.0)	72	1	R-MR								778	SVRN
13. SWP 5819	"	R,CPS	110	56	109	34	73	(41.2)	73	1	MR								772	
14. SWP 5820	"	R,CPS	124	58	110	40	84	(42.8)	71	1	MR-MS								1084	
15. SWP 5821	"	R,CPS	107	57	111	38	81	(47.0)	71	1	MR-MS								734	
16. SWP 5822	PROSPUR/HY 320	R,CPS	109	59	117	45	73	(21.4)	73	1	R-MR								1108	PRS
17. SWP 5823	"	R,CPS	108	61	112	46	82	(36.6)	70	1	MR								978	NR,SVRN
18. SWP 5824	"	R,CPS	99	54	111	36	68	40.4	72	1	MR		12.7	90	60	2.1	550	31.1	1097	
19. SWP 5825	"	R,CPS	104	58	111	41	75	(40.8)	74	1	MR								438	SVRN
20. SWP 5826	"	R,CPS	92	63	113	46	82	(37.0)	69	1	MR-MS								1036	VRN
21. SWP 5827	PROSPUR/HY 320	R,CPS	112	59	110	39	73	(43.2)	72	1	MR-MS								676	PRS
22. SWP 5828	"	R,CWRS	100	60	112	43	79	(35.4)	74	1	MR								1050	NR,PRS
23. SWP 5829	"	R,CPS	94	59	112	37	67	(44.4)	73	1	MR-MS								380	
24. SWP 5830	"	R,CPS	59	52	113	39	65	(35.0)	70	1	MS								407	
HY 320 1451 g/plot																				
Locations:			2	2	IRR	NB	2	2(IRR)	IRR				3	3	3					

SWP Y I (46), 1988 - DATA SUMMARY (NIPAVIN, IRRIGATED).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	TEST WT.	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MICROGRAPH MPRT	MICROGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	96	52	110	85	37.4	72	1	MR		14.4	109	55	1.7	600	33.1	854	
2. HY 320		R,CPS	100	51	111	61	42.9	69	1	MR-MS		12.5	53	67	2.1	670	31.9	771	
3. Oslo		R,CPS	90	48	105	56	39.3	72	1	MR-MS		13.5	61	68	2.1	600	44.1	828	
4. SWP 5831	PROSPUR/HY 320	R,CPS/U	62	49	112	71	45.8	68	1	MS								392	MR,XVRN
5. SWP 5832	"	R,CPS	47	49	114	70	47.0	72	1	MS								272	PRS
6. SWP 5833	PROSPUR/HY 320	R,CPS	95	56	112	85	46.1	73	1	MR								1018	MR,SVRN
7. SWP 5834	"	R,CPS	99	56	115	73	42.6	70	1	R-MR								913	VRN
8. SWP 5835	"	R,CPS	114	54	110	75	45.1	71	1	R-MR		12.3	83	60	2.0	600	26.4	779	S.SMK.,XVRN
9. SWP 5836	"	R,CPS	90	57	114	73	40.0	70	1	R-MR								974	MR,PRS
10. SWP 5837	"	R,MIX	97	54	111	69	40.8	74	1	MR								794	
11. SWP 5838	PROSPUR/HY 320	R,CPS	91	49	109	63	48.1	69	1	MR		12.7	51	68				668	SOFT
12. SWP 5839	"	R,CPS	89	53	111	66	40.8	71	1	MR		12.4	104	56	1.8	530	32.7	296	PRS
13. SWP 5840	"	R,CPS	112	56	111	73	45.1	71	1	MR								1424	VRN
14. SWP 5841	"	R,CPS	96	57	112	69	41.7	72	1	R-MR								1058	MR,SVRN
15. SWP 5842	"	R,CPS	105	53	111	69	41.6	73	1	MR-MS		12.9	88	62	1.7	610	27.6	886	
16. SWP 5843	PROSPUR/HY 320	R,CPS	103	57	114	77	37.6	71	1	MR								1191	MR,VRN
17. SWP 5844	"	R,CPS	102	56	113	75	41.6	71	1	MR-MS								339	VRN
18. SWP 5845	ENO/SNY/.../HY 320	R,CPS?	100	55	113	73	39.1	72	1	MR								401	SVRN
19. SWP 5846	"	R,CPS	100	53	113	76	45.4	72	1	MR		13.6	92	59	1.8	600	32.3	539	
20. SWP 5847	"	R,CPS/U	102	55	113	74	47.0	75	1	MR								?	
21. SWP 5848	ENO/SNY/.../HY 320	R,MIX	45	54	120	69	42.2	69	1	MR								703	MR,VRN
22. SWP 5849	"	R,CPS	81	53	112	72	44.4	69	1	MR-MS								315	SVRN
23. SWP 5850	"	R,MIX	101	50	109	61	42.6	72	1	MR-MS		12.0	86	61	2.4	540	34.3	764	
24. SWP 5851	HY 320/3/AT 66../ROGUE	R,MIX	86	53	110	61	45.1	75	1	MR-MS								551	
HY 320 = 1358 g/plot																			
Locations:			2	2	IRR	2	2	IRR				3	3	3					

SWP Y I (47), 1988 - DATA SUMMARY (NIPAWIN, IRRICANA).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	TEST WT.	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	87	51	109	84	33.4	72	1	MR		14.3	108	58	1.8	580	35.9	780	
2. HY 320		R,CPS	100	50	106	61	38.0	69	1	MR-MS		12.7	43	70	1.9	650	31.5	695	
3. Oslo		R,CPS	97	48	117	59	36.7	76	1	MR-MS		13.3	66	67	1.8	630	44.5	706	
4. SWP 5852	HY 320/3/AT 66../ROGUE	R,MIX	75	53	114	73	(35.8)	68	1	MR-MS								817	NR
5. SWP 5853	"	R,CPS?	83	56	11	74	(31.6)	69	1	MR								491	NR,VRN
6. SWP 5854	HY 320/3/AT 66../ROGUE	R,MIX	95	58	116	68	(32.8)	66	1	MR-MS								636	NR,VRN
7. SWP 5855	"	R,CPS/U	91	53	110	66	(42.6)	75	1	MR								893	
8. SWP 5856	"	R,MIX	79	55	111	70	(38.2)	69	1	MR-MS								261	
9. SWP 5857	"	R,CPS	80	49	113	64	(41.4)	78	1	MS								861	
10. SWP 5858	"	R,CPS	91	50	106	59	41.1	73	1	MS		12.7	79	64	1.6	630	35.1	632	
11. SWP 5860	NURI/WALDRON//HY 320	R,CPS	77	59	108	90	(31.2)	59	1	MR								924	NR,PRS
12. SWP 5861	"	R,CPS	62	51	113	65	(33.8)	71	1	MR								1291	VRN
13. SWP 5862	"	R,CPS	78	52	112	64	(34.4)	71	1	MR								529	SVRN
14. SWP 5863	"	R,CPS	92	57	121	84	(33.0)	71	1	R-MR								484	
15. SWP 5864	"	R,CPS	51	57	117	71	(29.2)	64	1	MR-MS								539	NR,XVRN
16. SWP 5865	NURI/WALDRON//HY 320	R,CPS	98	57	111	72	(30.8)	69	1	MR								524	NR,VRN
17. SWP 5866	"	R,CPS	66	54	113	80	(34.6)	74	1	MR-MS								685	PRS
18. SWP 5867	"	R,CPS	62	50	112	69	(36.4)	73	1	MR								713	
19. SWP 5868	"	R,CPS	119	55	112	68	(35.0)	71	1	MR								1052	SVRN
20. SWP 5869	"	R,CPS	91	57	113	84	(36.4)	70	1	R-MR								765	NR,VRN
21. SWP 5870	NURI/WALDRON//HY 320	R,CPS	84	50	107	61	(33.2)	75	1	MR								384	
22. SWP 5871	"	R,CPS	62	53	118	72	(30.4)	68	1	MR								222	S.SPK.,XVRN
23. SWP 5872	"	R,CPS	93	58	112	74	(32.0)	68	1	R-MR								743	NR,XVRN
24. SWP 5903	NO66/BB/.../HY 320	R,CPS	53	57	110	68	(32.2)	65	1	MR-MS								606	NR,PRS
HY 320 = 1356 g/plot																			
Locations:			2	2	IRR	2	2(IRR)	IRR				3	3	3					

SWP Y I (48), 1988 - DATA SUMMARY (KIPAWIN, IRRICANA).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	TEST WT.	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	86	52	110	77	34.0	73	1	MR		14.2	112	53	1.9	550	32.7	804	
2. HY 320		R,CPS	100	51	108	59	42.9	73	1	MR-MS		12.5	47	70	2.4	620	31.1	747	
3. Oslo		R,CPS	93	48	106	58	37.7	74	1	MR-MS		13.6	69	66	2.2	640	45.3	720	
4. SWP 5876	ERA/2*PROTOR//HY 320	R,CPS	88	57	115	78	(31.6)	67	1	R-MR								361	NR,VRN
5. SWP 5877	"	R,CPS	73	59	119	78	(22.0)	56	1	R-MR								760	S.SPK.,XVRN
6. SWP 5878	ERA/2*PROTOR//HY 320	R,CPS	86	57	115	73	(32.4)	69	1	R-MR								1400	NR,SVRN
7. SWP 5879	"	R,CPS	84	50	108	64	40.2	72	1	MS		14.2	109	56	1.4	520	32.3	687	
8. SWP 5882	"	R,CPS	88	58	115	67	(31.8)	68	1	MR								1093	NR,VRN
9. SWP 5883	BB/3/TZPP/SN.../HY 320	R,CPS	81	57	115	69	(34.6)	69	1	MR								877	NR,VRN
10. SWP 5884	"	R,CPS	83	58	114	77	(26.6)	64	1	R-MR								1117	NR,SVRN
11. SWP 5885	BB/3/TZPP/SN.../HY 320	R,CPS	98	60	115	80	30.0	63	1	R-MR		12.4	92	59	2.2	640	26.4	1223	NR,VRN
12. SWP 5886	"	R,CPS	101	55	113	69	(31.6)	70	1	MR-MS								917	
13. SWP 5887	"	R,CPS	92	52	108	67	41.6	72	1	MR-MS		12.6	84	62	2.2	510	34.4	1329	
14. SWP 5888	"	R,CPS	104	58	113	73	(34.2)	71	1	R-MR								1315	NR,SVRN
15. SWP 5889	"	R,CPS	70	53	116	70	(37.8)	71	1	MR								801	NR,PRS
16. SWP 5890	NO66/BB/.../HY 320	R,CPS	77	51	109	61	(40.0)	72	1	MR-MS								431	
17. SWP 5891	"	R,CPS	92	58	115	86	(31.2)	65	1	MR								1103	NR,PRS
18. SWP 5892	"	R,CPS	79	51	108	59	40.5	76	1	MS		13.2	103	57	1.7	550	37.4	849	
19. SWP 5893	"	R,CPS	48	49	113	66	(38.0)	72	1	MR-MS								328	NR,PRS
20. SWP 5895	"	R,CPS	44	49	117	59	(33.0)	74	1	MS								1175	NR
21. SWP 5896	NO66/BB/.../HY 320	R,CPS	105	56	113	74	(36.8)	73	1	MR								975	PRS
22. SWP 5900	"	R,MIX	66	56	114	71	(36.2)	72	1	MS								755	NR,XVRN
23. SWP 5902	"	R,CPS	68	51	113	77	(35.0)	72	1	MS								684	NR,XVRN
24. SWP 5904	"	R,CPS?	90	53	112	61	(35.2)	73	1	MR-MS								887	NR

SWP Y I (49), 1988 - DATA SUMMARY (NIPAWIN, IBRICANA).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	HEIGHT (CM)	1000K (G)	TEST WT.	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS NIRI	K. HARDNESS PSI	MICROGRAPH MPKT	MICROGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	91	53	108	79	34.4	72	1	MR		14.1	109	55	1.9	550	33.9	790	
2. HY 320		R,CPS	100	51	106	61	41.0	73	1	MS		12.8	66	65	2.3	570	32.7	795	
3. Oslo		R,CPS	94	48	113	56	37.7	74.	1	MR-MS		13.4	63	67	2.1	600	41.4	899	
4. SWP 5905	NO66/BB/.../HY 320	R,CPS	96	55	112	68	(34.2)	70	1	R-MS								1014	
5. SWP 5906	"	R,CPS	74	54	114	65	(34.2)	74	1	R								1016	
6. SWP 5908	NO66/BB/.../HY 320	R,CPS	85	50	109	60	(37.2)	72	1	R-MR								839	
7. SWP 5909	"	R,CPS	35	49	113	67	(41.2)	72	1	MS								309	NR,PRS
8. SWP 5910	"	R,CPS	66	49	113	69	(38.0)	71	1	MS								393	NR,XVRN
9. SWP 5911	"	R,CPS	76	50	111	61	(39.2)	73	1	MS								440	
10. SWP 5912	6WA693/RL 4137	R,CPS/U	99	53	120	70	46.4	74	1	MR		14.1	119	52				363	HARD
11. SWP 5913	RL 4137/6WA693	R,CPS	70	50	110	64	(38.4)	71	1	MS								181	XVRN
12. SWP 5914	6WA644/RL 4137	R,CPS	71	50	110	61	(38.4)	74	1	S								147	
13. SWP 5916	BB/3/TZPP/SN.../HY 320	R,CPS	100	56	112	70	(39.0)	69	1	MR								1336	NR,PRS
14. SWP 5917	"	R,CPS	93	49	112	70	45.0	74	1	MR-MS		12.9	84	59	2.0	580	40.6	768	
15. SWP 5919	"	LR,CPS	100	54	112	80	38.7	72	1	MR		12.4	73	64	2.0	510	28.0	403	
16. SWP 5921	BB/3/TZPP/SN.../HY 320	LR,CPS	52	49	112	69	(36.6)	74	1	MS								737	NR,XVRN
17. SWP 5923	"	LR,CPS	105	57	114	80	(31.2)	69	1	MR-MS								1465	NR,PRS
18. SWP 5924	"	LR,CPS	101	49	113	69	42.2	70	1	MR		12.3	112	53	2.0	510	34.3	941m	HARD
19. SWP 5925	"	R,CPS?	91	55	112	75	(34.6)	68	1	MR-MS								917	
20. SWP 5926	"	R,CPS	102	56	114	83	(34.0)	68	1	MR								753	NR,PRS
21. SWP 5927	BB/3/TZPP/SN.../HY 320	R,CPS	101	57	115	80	(39.8)	66	1	MS								940	NR,PRS
22. SWP 5930	SWP 9520/SWP 780191	LR,CPS	83	49	117	61	(39.2)	72	3	S								403	
23. SWP 5932	"	R,CPS	82	49	108	73	39.9	73	1	MR-MS		14.0	80	61	1.9	610	44.1	268	
24. SWP 5933	"	LR,CPS	90	49	113	60	40.2	73	1	S		12.4	76	62	2.0	630	39.4	825	

SWP Y I (50), 1988 - DATA SUMMARY (NORTH BATTLEFORD, IRRIGANA).

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%) (HY320)	HEAD. (DAYS)	MAT. (DAYS)	SPIKE MOIST. (%)	HEIGHT (CM)	1000K (G)	TEST WT	SHATTER. (1-5)	RUST RESIST. LEAF	RUST RESIST. STEM	PROTEIN (%)	K. HARDNESS MIRI	K. HARDNESS PSI	MIXOGRAPH MPKT	MIXOGRAPH MPKH	SED. (CC)	PURE SEED (G)	COMMENTS
1. Columbus		R,CWRS	82	53	106	33	85	33.6	75	1	MR		14.7	104	58	1.5	600	33.9	717	
2. HY 320		R,CPS	100	51	110	23	60	38.5	75	1	MS		11.9	39	72	2.4	575	30.7	677	
3. Oslo		R,CPS	81	48	108	24	61	34.6	77	1	MR-MS		13.1	56	69	1.9	580	40.2	801	
4. SWP 5934	SWP 9520/SWP 780191	R,CPS	72	49	105	16	73	(41.6)	76	3	MS								383	
5. SWP 5935	"	R,CPS	86	50	108	14	65	36.7	76	3.5	MS		12.9	91	61	1.9	620	39.0	683	
6. SWP 5937	SWP 9520/SWP 780191	R,CPS	79	51	106	18	70	34.1	76	1	MS		13.8	72	64	2.2	710	41.0	565	
7. SWP 5938	"	R,CPS,T	86	49	104	14	61	38.2	77	1	MS		13.1	80	63	1.8	680	39.8	633	
8. SWP 5939	"	LR,CPS	88	50	105	13	65	34.8	75	3.5	S		13.0	62	67	1.8	630	37.8	383	
9. SWP 5940	"	R,CPS	74	53	106	16	65	(35.2)	71	1	MS								317	
10. SWP 5941	"	R,CPS	75	50	108	13	64	(39.2)	75	1	MS								285	
11. SWP 5943	SWP 9520/QT 8132	R,CPS	71	52	105	17	51	(38.2)	72	1	R-MR								589	
12. SWP 5944	"	R,CPS	65	50	109	17	73	(32.6)	74	4	MR-MS								7.1	NR
13. SWP 5945	SWP 780191/SWP 9520	LR,CPS	80	51	106	21	70	(36.8)	75	1	MR								425	
14. SWP 5946	"	R,CPS	67	54	109	22	68	(36.2)	71	1	MR-MS								369	XVRN
15. SWP 5947	"	LR,CPS	89	54	112	17	68	(36.2)	72	1	MS-S								566	
16. SWP 5949	SWP 780191/SWP 9520	R,CPS	87	48	108	13	72	38.3	75	1	MS		12.2	75	65	1.7	580	33.5	523	
17. TYMEN 80		R,CPS?	73	52	107	18	87	39.5	77	1	MS		12.9	86	61	2.1	570	35.1	652	
18. NOVOSIBIRSK 67		R,MIX	71	54	111	18	100	33.0	75	1	MS		13.5	117	51	1.7	550	37.4	?	NR
19. YECORA ROJO		LR,CPS	72	46	104	12	50	38.3	78	3.5	S		14.2	66	67	2.7	610	48.1	488	
20. OMBU	(Watrous Only)	R,CPS	84	51	109	36	78	(40.8)	74	1	MR					1.4	520	33.1		
21. PONCHO	(Watrous Only)	R,CPS	88	50	110	20	71	(45.0)	73	1	MR-MS					2.4	615	47.7		NR,SVRN
22. NAPOSTA	"	R,CWRS	78	53	110	33	82	(33.8)	75	1	-									
23. NANCU	"	R,CWRS	80	51	109	25	79	(34.8)	76	1	-									
24. PANGARE	"	R,CWRS	79	52	108	27	84	(32.6)	74	1	-									

CPS F6 SELECTIONS, 1988.

Cross	Pedigree		Sent to California
			6
79203	HY 320/6WA644		3
79203B	6WA644/HY 320		1
79208A	HY 320/WRC 77-5		6
79209B	Prospur/HY 320		1
79210B	ENO/SNY/.../HY 320		2
79212B	Nuri/Waldron//HY 320		1
79213B	Era/2*Protor//HY 320		5
79214B	BB/3/TZPP/SN.../HY 320		5
79215B	NO66/BB/.../HY 320	Total	30

CPS F4 SELECTIONS, 1988.

Cross	Pedigree	Sent to California
86201	HY 320/Oslo	9
86202	HY 320/HY 362	1
86204	HY 320/SWP 757	11
86205	SWP 757/HY 320	13
86206	HY 320/SWP 780191	1
86207	SWP 780191/HY 320	18
86208	HY 320/SWP 9520	1
86209	SWP 9520/HY 320	1
86210	HY 320/SWP 9525	4
86211	SWP 9525/HY 320	23
86212	HY 320/85 U 0674	5
86213	HY 320/Wheaton	9
86214	Wheaton/HY 320	18
86215	Nordic/HY 320	3
86217	HY 912/Oslo	5
86220	Oslo/RL 4137	8
86221	SWP 9249/Oslo	28
86222	SWP 9254/Oslo	15
86223	Oslo/85 U 0674	9
86224	HY 362/Oslo	2
86225	Wheaton/Oslo	8
86227	Nordic/Oslo	1
86228	SWP 730/Oslo	23
86229	HY 358/Oslo	42
86230	Cajeme/Oslo	12
86231	HY 320/Cajeme	3
86232	SWP 9249/SWP 9525	5
86233	SWP 730/SWP 9525	7
86236	HY 358/SWP 9525	1
86238	HY 358/Nordic	10
86244	Oslo/SWP 9302	4
86245	Oslo/SWP 757	8
86246	Oslo/SWP 9525	6
86250	Nordic/SWP 9525	1
86254	SWP 9249/85 U 0674	1
86257	SWP 9254/SWP 9525	4
86259	HY 352/SWP 9525	2
86264	SWP 9525/Oslo	5
86266	Oslo*2/HY 358	5
86267	HY 320//HY 358/Nordic	1
86269	HY 320/Veery #2	1
86271	HY 320/SWP 9520//HY 358/Nordic	5

CPS F4 SELECTIONS, 1988. (CONTINUED)

Cross	Pedigree	Sent to California
86275	HY 320/Wheaton//Oslo	8
86276	Nordic/HY 320//Veery #2	1
86277	Nordic/HY 320//Tan "S"	7
86279	HY 358/*2 Oslo	7
86280	Tan "S"//HY 320/Wheaton	2
86281	Tan "S"//SWP 9254/Oslo	6
86282	Tan "S"/Oslo	8
86283	Veery #2/HY 320	2
86285	HY 358/HY 912//HY 320	2
	Total	436

CPS F3 SELECTIONS, 1988.

Cross	Pedigree	Sent to California	1989 F4
87206 LS	Oslo*3/HY 358	10	1
87218 LS	Nordic//HY 358	4	0
87220 LS	Nordic/3/HY 320//HY 358/Nordic	7	0
87223 LS	Nordic/3/HY 320/SWP 9520//HY 358/Nordic	2	0
87225 LS	Nordic//HY 358/Oslo	8	0
87235 & 87237	(Mixed)	0	10
87242 LS	SWP 9302//HY 358/Nordic	10	5
87252 LS	SWP 9521//HY 352/SWP 9525	0	8
87265	Oslo*2/RL 4137	42	139
	Totals	83	163

CPS F2 SELECTIONS, 1988. (CONTINUED)

Cross	Pedigree	Sent to California	1989 F3
87249	SWP9521//Oslo/85 U 0674	0	19
87251	SWP 9521//SWP 757/RL 4137	9	0
87252	SWP 9521//HY 352/SWP 9525	0	11
87253	SWP 9521//SWP 9520/QT 8132	20	20
87255	SWP 9521/Arin	0	7
87256	SWP 9521/Oslo	0	15
87257	SWP 9521/Sun 56A	20	47
87258	SWP 9520/QT 8132//SWP 9521	0	24
87260	SWP 9249/Ltbr	0	7
87261	Nordic/Ltbr	20	20
87262	Nordic/Norstar	20	22
87262W	Nordic/Norstar	10	0
87263	Nordic/Oslo	20	26
87266	Nordic/SWP 2599	0	34
87267	Nordic/SWP 2607	14	0
87268	Nordic/SWP 9302	16	0
87269	Oslo/Norstar	0	37
87269W	Oslo/Norstar	0	3
87270	Oslo/U 761-J4-B6-B1	0	20
87271	Oslo/SWP 2599	0	12
87272	Oslo/SWP 2601	10	0
87273	Oslo/SWP 2607	20	31
87274	Oslo/SWP 2613	5	0
87277	SWP 2599/U 761-J4-B6-B1	0	21
87278	SWP 2599/SWP 2613	9	0
87279	SWP 2599/SWP 9302	3	0
87283	SWP 2613/SWP 2599	17	0
87284	SWP 9249/Ltbr	0	2
87285	SWP 9249/SWP 2599	0	8
87286	SWP 9249/SWP 2613	20	15
87287	SWP 9302/Ltbr	0	5
87288	SWP 9302/Nordic	20	20
87289	SWP 9302/U 761-J4-B6-B1	0	27
87290	SWP 9302/SWP 2599	20	63
87291	SWP 9302/SWP 2599	0	72
87293	SWP 9521/U 761-J4-B6-B1	0	6
87294	SWP 9521/SWP 2607	18	0
87297	SWP 9525/U 761-J4-B6-B1	0	39
87298	SWP 9525/SWP 2590	20	32
87299	Nordic*2//Oslo*2/RL 4137	18	0
87300	Nordic*2/3/HY 358/HY 912//HY 320	5	0
87301	Nordic//SWP 9249/Ltbr	13	0
87302	Oslo*4/RL 4137	98	16

CPS F2 SELECTIONS, 1988.

Cross	Pedigree	Sent to California	1989 F3
87201	Oslo*2/Cajeme	0	33
87202	Oslo//HY 912/HY 352	6	0
87203	Oslo//SWP 757/RL 4137	20	3
87204	Oslo//HY 352/SWP 9525	0	42
87205	Oslo*3/RL 4137	129	97
87206	Oslo*3/HY 358	20	20
87209	Oslo/Sun 56A	20	37
87210	Oslo/SWP 2604	0	44
87211	Oslo/SWP 9521	0	17
87212	Nordic//HY 320/Oslo	19	0
87213	Nordic//HY 320/SWP 757	0	53
87215	Nordic//Oslo/85 U 0674	0	8
87216	Nordic//SWP 730/Oslo	0	16
87217	Nordic//Cajeme/Oslo	0	27
87218	Nordic//HY 358/Nordic	20	22
87219	Nordic//Oslo*2/RL 4137	46	60
87220	Nordic/3/HY 320//HY 358/Nordic	20	17
87221	Nordic/3/HY 320//Oslo/RL 4137	11	0
87222	Nordic//HY 320/Kea "S"	9	0
87223	Nordic/3/HY 320/SWP 9520//HY 358/Nordic	11	0
87224	Nordic/3/Nordic/HY 320//Veery #2	18	18
87225	Nordic//HY 358/*2 Oslo	20	28
87226	Nordic/3/HY 358/HY 912//HY 320	4	0
87228	Nordic//HY 320/HY 912	18	0
87229	Nordic/SWP 9521	20	4
87230	Nordic/Arin	0	10
87231	SWP 2604/Oslo	0	18
87232	SWP 9249//HY 320/SWP 9520	0	19
87233	SWP 9249//Oslo*2/RL 4137	30	39
87234	SWP 9249//Oslo*2/Hy 358	20	9
87235	SWP 9249/3/HY 320//HY 358/Nordic	16	0
87236	SWP 9249//HY 320/Veery #2	0	9
87237	SWP 9249//HY 358/*2 Oslo	20	32
87239	SWP 9249/SWP 2604	0	9
87240	SWP 9249/Arin	0	9
87241	SWP 9249/Nordic	0	6
87242	SWP 9302//HY 358/Nordic	20	28
87243	SWP 9302//Oslo*2/RL 4137	20	21
87244	SWP 9302/3/HY 320//Oslo/RL 4137	18	0
87245	SWP 9302//HY 320/Veery #2	19	0
87246	SWP 9302//HY 358/*2 Oslo	14	0
87247	SWP 9302/SWP 9521	0	10
87248	SWP 9521//HY 320/SWP 757	0	20

CPS F2 SELECTIONS, 1988. (CONTINUED)

Cross	Pedigree	Sent to California	1989 F3
87303	Oslo/3/Nordic//Oslo*2/RL 4137	17	0
87304	Oslo/4/Nordic/3/HY 358/HY 912//HY 320	8	0
87305	Oslo/3/SWP 9249//Oslo*2/RL 4137	5	0
87306	Oslo//SWP 9249/Ltbr	0	4
87307	SWP 9249//Oslo*3/RL 4137	52	5
87308	SWP 9249*2//Oslo*2/RL 4137	30	15
87309	SWP 9249/3/SWP 9302//Oslo*2/RL 4137	3	0
87310	SWP 9302//Oslo*3/RL 4137	38	12
87311	SWP 9302*2//Oslo*2/RL 4137	7	0
87312	SWP 9521/3/SWP 9520/QT 8132//SWP 9521	13	0
	Totals	1206	1502

SWS F4 SELECTIONS, 1988.

Cross	Pedigree	Sent to California
86601	Owens/Fd	13
86602	Fd/Owens	10
86603	SWP 735/Fd	3
86604	SWP 746/Fd	7
86605	Fd/SWP 9603	2
86606	Fd/CI 682-70	8
86607	SWP 734/Fd	4
86608	Fd/SWP 9535	8
86609	SWP 9535/Fd	12
86610	Fielder/SWP 9487	4
86611	Fielder/Potam	8
86612	Potam/Fd	9
86614	HY 402/Fd	19
86615	Fd/Oslo	7
86617	Fd/Kewell	4
86618	Fd/Olympic	15
86619	Fd/Insignia	12
86620	Fd/Lance	18
86621	Owens/CI 682-70	2
86622	Owens/SWP 9487	8
86623	SWP 9603/Owens	2
86624	SWP 746/Owens	1
86625	Fd*2/Potam	11
86626	Fd*2/Lance	8
86628	Fd/Veery #2	22
86629	BZ 684-24//SWP 9603/Owens	4
86631	BZ 684-24//Fd/Potam	31
86632	BZ 684-24//Fd/Insignia	8
86633	BZ 684-24//SWP 734/Fd	4
86634	BZ 684-24/Veery #2	20
86635	Fd/SWP 9535//Fd/Potam	5
86636	Fd/SWP 9535//Fd/Oslo	3
86637	Fd/Potam//Owens/SWP 9487	7
86638	Fd/Oslo//SWP 9603/Owens	2
86639	Fd/Lance//Oslo	1
86640	Owens/Fd//Fd/Lance	6
	Total	308

SWS F2 SELECTIONS, 1988.

Cross	Pedigree	Sent to California
87601	Fd/85203	21
87602	Fd/86265-85	10
87603	Fd/86606	15
87604	Fd/SUN 56A	78
87605	Fd/SWP 1601	78
87606	Fd/SWP 2591	30
87607	Fd/SWP 2604	7
87610	SWP 1601/FD	44
87611	SWP 1601/SUN 56A	26
87612	Fd/SWP 2601	2
87613	BZ 684-24/K321	87
87615	Owens/Potam	8
	Total	406

WINTER CROSSES, 1988.

Cross	Pedigree
CPS	
88201	Nordic/87218D [Nordic*3/HY 358]
88202	Nordic/87225B [Nordic*2//HY 358/*2 Oslo]
88203	Nordic 87272 [Noridc//Oslo/SWP 2601]
88204	Nordic 87302-94A [Nordic//Oslo*4/RL 4137]
88205	Oslo/87270 [Oslo*2/U761.....]
88206	SWP 9249/87225B [SWP 9249/3/Nordic//HY 358/*2 Oslo]
88207	SWP 9249/87309-97 [SWP 9249*2/SWP 9302//Oslo*2/RL 4137]
88208	SWP 9302/87218D [SWP 9302//Nordic*2/HY 358]
88209A	SWP 9302/87237A [SWP 9302/3/SWP 9249//HY 358/*2 Oslo]
88209D	SWP 9302/87237D [SWP 9302/3/SWP 9249//HY 358/*2 Oslo]
88209E	SWP 9302/87237E [SWP 9302/3/SWP 9249//HY 358/*2 Oslo]
88209F	SWP 9302/87237F [SWP 9302/3/SWP 9249//HY 358/*2 Oslo]
88210	SWP 9302/87268 [SWP 9302*2/Nordic]
88211	SWP 9302/87270 [SWP 9302//Oslo/U761 - J4-B6-B1]
88212	SWP 9302/87287-266 [SWP 9302*2/Ltbr]
88213	SWP 9302/87302-102 [SWP 9302//Oslo*4/RL 4137]
88214	SWP 9302/87310-96A [SWP 9302*2//Oslo*3/RL 4137]
88215	SWP 9521/Losprout
88216	SWP 9521/87237 [SWP 9521/3/SWP 9249//HY 358/*2 Oslo]
88217	SWP 2590/87708 [SWP 2590//SWP 2613/REG 1906]
88218	SWP 2591/87701 [SWP 2591//Wakooma/BSW]
88219	SWP 2591/87706 [SWP 2591//SWP 2613/REG 1906]
88220	SWP 2591/87707 [SWP 2591/RL 5337/Nordic]
88221	SWP 2599/87278 [SWP 2599*2/SWP 2613]
88222	SWP 2613/87704 [SWP 2613*2/RL 5337]
88223	SWP 2613/87705 [SWP 2613*2/REG 2899]
88224	HY 355/87242E [HY 355/3/SWP 9302//HY 358/Nordic]
88225	HY 355/87237E [HY 355/3/SWP 9249//HY 358/*2 Oslo]
SWS	
88601	Fielder/87613 [Fielder//BZ 684-24/K 321]

1988 CPS SUMMER CROSSING PROGRAM

SWP Cross No.	Pedigree		Seeds Harvested	Seeds to W.Nursery
88226	HY 355/Aurifen		2	
88227	HY 355/AUS 1408 (R)		16	10
88228	HY 355/Onda (R)		2	
88229	HY 355/Veery #2 (R)		9	
88230	HY 355/Vireo "S" (R)		5	
88231	HY 355/SWP 2590		6	
88232	HY 355/87218C(LS)		1	
88233	HY 355/87223B(LS)		2	
88234	HY 355/87226A(LS)		13	5
88235-C	HY 355/87237C(LS)		3	
88235-G	HY 355/87237G(LS)		9	
88236	HY 358/Aurifen		11	
88237	HY 358/HY 355 (R)		37	27
88238	HY 358/Oslo		3	
88239	HY 358/Vireo "S"		4	
88240	HY 358/SWP 2601 (R)		1	
88241	HY 358/SWP 9249		4	
88242	HY 358/SWP 9302 (R)		4	
88243	HY 358/SWP 9521		1	
88244	HY 358/87218		2	
88245	HY 358/87299		4	
88246	Nordic/Aurifen		1	
88247	Nordic/HY 355	(PBI=10)	48	28
88248	Nordic/Losprout		11	
88249	Nordic/Owens		1	
88250	Nordic/Veery #2		7	
88251	Nordic/CI 6938 (WW)		19	9
88252	Nordic/87206(LS)		2	
88253	Nordic/87218B(LS)		6	
88254-A	Nordic/87220A(LS)		7	
88254-D	Nordic/87220D(LS)		2	
88255-D	Nordic/87235D(LS)		2	
88255-E	Nordic/87235E(LS)		2	
88255-F	Nordic/87235F(LS)		15	5
88256-B	Nordic/87237B(LS)		12	5
88256-G	Nordic/87237G(LS)		1	
88256-H	Nordic/87237H(LS)		7	
88257-F	Nordic/87242F(LS)		1	
88257-G	Nordic/87242G(LS)		3	
88258-B	Nordic/87251B(LS)		5	
88258-E	Nordic/87251E(LS)		5	
88259	Oslo/Aurifen (R)		4	
88260	Oslo/HY 355		3	
88261	Oslo/Losprout		25	15

SWP Cross No.	Pedigree		Seeds Harvested	Seeds to W. Nursery
88262	Oslo/Onda (R)		6	
88263	Oslo/RL 4137		14	5
88264	Oslo/Vireo "S" (R)		10	
88265	Oslo/SWP 9521		1	
88266	Oslo/87262		16	6
88267	Onda/HY 355 (R)	(PBI=20)	71	41
88268	Onda/HY 358		4	
88269	Onda/Oslo (R)		56	50
88270	Onda/SWP 1602		3	
88271	Onda/SWP 9302 (R)		3	
88272	Onda/SWP 9521		40	30
88273	SWP 1602/Aurifen		11	
88274	SWP 1602/HY 355		24	14
88275	SWP 1602/HY 358		2	
88276	SWP 1602/Nordic		2	
88277	SWP 1602/Oslo		7	
88278	SWP 1602/SWP 9249 (R)		5	
88279	SWP 1602/SWP 9302 (R)		4	
88280	SWP 2601/Aurifen		7	
88281	SWP 2601/HY 355	(PBI=40)	105	55
88282	SWP 2601/Nordic		11	
88283	SWP 2601/Oslo		7	
88284	SWP 2601/Vireo "S"		10	
88285	SWP 2601/SWP 9249 (R)	(PBI=5)	20	15
88286	SWP 2601/SWP 9302		7	
88287	SWP 2601/SWP 9521		4	
88288	SWP 2601/87262		17	7
88289	SWP 9249/Aurifen		18	8
88290	SWP 9249/AUS 1408		7	
88291	SWP 9249/HY 355		3	
88292	SWP 9249/Losprout	(PBI=20)	79	49
88293	SWP 9249/Veery #2		26	16
88294	SWP 9249/Vireo "S"		2	
88295	SWP 9249/SWP 1602 (R)		25	20
88296	SWP 9249/SWP 2591		14	6
88297	SWP 9249/SWP 2601 (R)		3	
88298	SWP 9302/Aurifen (R)	(PBI=20)	83	53
88299	SWP 9302/HY 355		31	21
88300	SWP 9302/HY 358 (R)		5	
88301	SWP 9302/Losprout (R)		28	18
88302	SWP 9302/Nordic		6	
88303	SWP 9302/Norstar		7	
88304	SWP 9302/Onda (R)		5	
88305	SWP 9302/Veery #2 (R)	(PBI=20)	60	30
88306	SWP 9302/SWP 1602 (R)		7	
88307	SWP 9302/SWP 9249		5	

SWP Cross No.	Pedigree		Seeds Harvested	Seeds to W. Nursery
88308	SWP 9302/87225D(LS)		1	
88309	SWP 9302/87242E(LS)		1	
88310	SWP 9302/87262		28	18
88311	SWP 9302/87269		4	
88312	SWP 9521/Aurifen (R)	(PBI=20)	74	44
88313	SWP 9521/Losprout		24	14
88314	SWP 9521/Veery #2		7	
88315	SWP 9521/Vireo "S"		3	
88316	SWP 2591/Aurifen		4	
88317	SWP 2591/Centrifen		5	
88318	SWP 2591/Nordic		5	
88319	SWP 2591/Veery #2		35	25
88320	SWP 2591/SWP 9302		4	
88321	SWP 2591/SWP 9521		13	5
88322	Veery #2/HY 355 (R)		15	15
88323	Veery #2/Onda		12	
88324	Veery #2/Oslo		4	
88325	Veery #2/SWP 9302 (R)		6	
88326	Vireo "S"/HY 355 (R)		3	3
88327	Vireo "S"/Oslo (R)		4	
88328	Aurifen/HY 355 (R)		16	8
88329	Aurifen/Oslo (R)		3	
88330	Aurifen/SWP 9302 (R)		2	
88331	Aurifen/SWP 9521 (R)		1	
88332	AUS 1408/HY 355 (R)		6	
88333	AUS 1408/Nordic		10	
88334	AUS 1408/SWP 9302		7	
88335	Losprout/HY 355		58	48
88336	Losprout/HY 358		1	
88337	Losprout/SWP 9302 (R)		5	
88338	HY 912/Losprout		1	
88339	HY 320/Aurifen		17	8
88340	HY 320/Onda		7	
88341	HY 320/Oslo		14	7
88342	HY 320/87262		12	4
88343	Aurifen/SWP 1635		6	
88344	SWP 1635/HY 355		1	
88345	SWP 1635/Losprout		4	
88346	HY355/HY358 (R)		24	24
88347	SWP 2601/HY 358 (R)		3	

NOTE:

87206 = Oslo*3/HY 358
87218 = Nordic*2/HY358
87220 = Nordic/3/HY 320//HY 358/Nordic
87223 = Nordic/3/HY 320/SWP 9520//HY 358/Nordic
87225 = Nordic//HY 358/*2 Oslo
87226 = Nordic/3/HY 358/HY 912//HY 320
87235 = SWP 9249/3/HY 320//HY 358/Nordic
87237 = SWP 9249//HY 358/*2 Oslo
87242 = SWP 9302//HY 358/Nordic
87251 = SWP 9521/SWP 757/RL 4137
87262 = Nordic/Norstar
87269 = Oslo/Norstar
87299 = Nordic*2//Oslo*2/RL 4137

1988 SWS SUMMER CROSSING PROGRAM

SWP Cross No.	Pedigree	Seeds Harvested	Seeds Sent To Chile
88602	Fielder/SWP 1635 (R)	12	12
88603	Fielder/Lasprout	21	11
88604	Fielder/Centrifen (R)	16	6
88605	Fielder/77W/599 (R)	20	0
88606	Fielder/HY 358	18	10
88607	Fielder/SWP 1602	4	4
88608	Fielder/SWP 88601	21	21
88609	Centrifen/Fielder (R)	20	20
88610	Centrifen/SWP 2591	3	0
88611	Centrifen/HY 355	1	0
88612	Centrifen/Losprout	17	0
88613	Centrifen/SWP 1635	4	0
88614	Centrifen/Nordic	5	0
88615	SWP 1635/Fielder (R)	13	0
88616	SWP 1635/SWP 1602	10	0
88617	SWP 1635/Vireo 'S'	1	0
88618	77W/599/Fielder	76	76
88619	77W/599/SWP 9521	2	0
88620	SWP 1602/Fielder	20	20

PH/ci
August 31, 1988.
CWRS&SWS.88.AR

1987 ANNUAL REPORT

ERDA PROJECT NO. 1.1 - 11

Selection and Evaluation of improved high yielding spring wheats for the Canada Prairie and Soft White Spring classes.

PROGRESS REPORT FOR 1987 AS PER APPENDIX "A"

The 1987 crop season was the second year during which promising experimental wheat lines were yield tested under the auspices of this ERDA project. In 1986 one line, SWP 2599 was identified as a potential Canada Prairie Spring (CPS) Co-op test candidate.

FIRST YEAR CO-OP ENTRY

SWP 2599
(HY 320/WRC 77-1). This line was entered in the 1987 High Yielding (HY 'C') wheat Co-op test. The performance of SWP 2599 was disappointing; yielding 4 and 14% less than Neepawa and HY 320, respectively. It would appear that the superior rust resistance of SWP 2599 resulted in the yield advantage observed during the 1986 rust epidemic. In the absence of disease pressure in 1987 SWP 2599 did not show a yield advantage over HY 320. This line will not be tested further.

PROMISING LINES IDENTIFIED IN 1987 (SWP Y III (D))

Two experimental lines with CPS (Red) quality were identified in the SWP Y III (D) multi-location trial.

SWP 9255
(HY 320/6WA644) yielded 23 and 4% more than Neepawa and HY 320, respectively. This line is agronomically similar to HY 320 but has a larger kernel. SWP 9255 has good stem rust resistance but its leaf rust resistance is slightly inferior to that of HY 320.

SWP 9301
(BB/3/TZPP/SN..../4/HY 320) yielded 21 and 2.5% more than Neepawa and HY 320, respectively. SWP 9301 matured 2 days earlier than HY 320 and has a larger kernel. As was the case for SWP 9255 this line has good stem rust resistance but is lacking in leaf rust resistance, limiting its potential production area to the Western Prairies.

Both of these lines will be submitted for evaluation in the 1988 High Yielding Wheat 'B level' Co-op test.

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OTHER HIGH YIELDING WHEAT LINES (SWP Y III (D), Y II (L))

A number of very high yielding wheat lines were initially identified in 1986. These SWP lines did not fall within the CPS or CWSWS quality categories or lacked the proper kernel morphology. This material was retested in 1987 to confirm its yield potential and disease reaction. Some of these lines (SWP 2590, 1601, 1602, 1607, 1635, 2591) will be used in the CPS and CWSWS crossing programs in 1988.

A number of those lines (eg. SWP 1601, 1602, 1607, 1635, 2591, 1628) have a high starch - low protein content. Some of this material has out yielded HY 320 by up to 11% in both 1986 and 1987. Due to their very high yield potential and high starch content these experimental lines would be ideal for ethanol production should this industrial end use of wheat become economical in the near future. Based on 1986/1987 ERDA - sponsored yield trials the following lines appear to hold more promise:

	YIELD (% HY 320) -	MATURITY (DAYS)	PROTEIN (%)	RUST REACTION	
				LEAF	STEM
HY 320	100	102	11.2	20M	10MR
SWP 1601	108	101	10.9	40M	10MR
SWP 1602	110	102	11.0	20MR	7MR
SWP 2591	113	104	10.6	TR	15MR
n =	10	10	11		

ADVANCED GENERATION SOFT WHITE SPRING WHEAT LINES

A limited number (9) of SWS lines (mostly F7 generation) were tested at two sites in 1987 (SWP Y II (L)). Only two lines (SWP 1628, 3895) had yield levels warranting further evaluation. Both of those lines, however, have kernel distinguishability problems and in one case inferior leaf rust resistance. Consequently, these lines will not be tested in 1988.

PRELIMINARY YIELD EVALUATIONS (Y I (16), (20)-(25))

In 1987, 142 experimental lines (F6, F7, or F8 generation) were yield tested for the first time. These lines were obtained from single head selections made in F4, F5 or F6 bulked plots grown at two locations in 1986. Thirteen (13) SWS lines were evaluated in Y I (16). The remaining lines fell into the CPS category. None of the SWS evaluated in the Y I (16) trial warranted further testing due to their inferior yield performance in 1987.

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Of the 126 CPS lines evaluated in 1987 approximately 35-40 appear to be characterized by an adequate kernel hardness and morphology. These lines will be yield tested at 4 sites in 1988.

EARLY GENERATION MATERIAL (F2-F4)

F4

Of the approximately 1,600 CPS F2 head selections made in 1986 approximately 30% (n = 486) were harvested as F4 head selections in 1987. Head rows of those F4 selections are currently being grown out in the SWP winter nursery at Phoenix, AZ. Lines with suitable kernel characteristics (hardness, shape and size) will be yield tested in 1988. This material represents the first phase of the early generation program expansion initiated in 1986. The 34 populations which are represented by the nearly 500 F4 selections were obtained from crosses made by the SWP non bread wheat breeding program between 1979 and 1985.

F2

Phase 2 of the early generation program expansion was begun during the summer and fall of 1986. At that time, 85 new CPS and 40 new SWS crosses were made. The material from those crosses was grown out in F2 plots at three sites in 1987. Approximately 2,800 head selections were made of which ca. 1,800 have been sent to our winter nursery.

NEW BREEDING MATERIAL

In 1987, 112 CPS and 15 SWS populations were obtained from our growth room and greenhouse crossing programs. A majority of the new CPS crosses were aimed at transferring sprouting and loose smut resistance into Oslo and HY 320-maturity genetic backgrounds. A number of populations segregating for bunt resistance have also been generated. The new SWS populations were generated with the objective of improving the rust resistance (*P. recondita*, *P. graminis*) of currently registered cultivars.

PROJECT EXPENDITURES

Expenditures for the second year of this project are presented in Table 16. Funding obtained from ERDA/ADF accounted for approximately 60% of the project's costs. Salaries of Technical and seasonal staff increased due to a greater level of in house quality testing which is reflected in a drop in sub contracted quality analyses (item 4, Table 16). Two additional expenditures (items 8 & 11) were accidentally omitted in the previous annual report. Over all 1987 expenditures did not rise to the expected level due to a change in personnel.

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PERSONNEL

A list of personnel involved in the CPS/SWS breeding program is presented in Table 17. The original project manager Dr. L. Song, resigned his position with the Saskatchewan Wheat Pool effective June 1, 1987. Consequently, his successor Dr. Pierre Hucl took over his responsibilities at that time. Robert Graf (currently completing his PhD at the University of Saskatchewan) will resume his duties as CPS wheat breeder in March 1988. The soft white wheat breeding program will remain the responsibility of P. Hucl.

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TABLE 16. EXPENDITURES ON THE CPS/SWS WHEAT BREEDING PROGRAM (MARCH 1,1987 - FEBRUARY 29, 1988)

1. Salaries	
(a) Professional	$27,187.00
(b) Technical & Seasonal	30,961.00
2. Operating costs & supplies	1,881.35
3. Land rental	952.00
4. Quality analyses	650.00
5. Winter nursery	7,097.14
6. Farm operations	5,578.25
7. Travel & vehicle maintenance	3,485.32
8. Alberta & Manitoba yield plots	5,763.00
9. Farm overhead	12,697.00
10. Office overhead	6,496.57
11. Data processing	4,998.00
Total	$107,746.63

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TABLE 17. PERSONNEL & TIME ALLOCATED TO PROJECT

Personnel	Time Allocation		Position
P. Hucl	(March 1-May 31, 1987)	100%	Sr. Wheat Breeder
	(June 1, 1987-February 29, 1988)	25%	
* R.J. Graf	(July 1-September 30, 1987)	100%	Wheat Breeder
B. Fowler		22%	Technician III
M. Tiessen		35%	Technician III
G. Pappenfoot		35%	Farm Worker II
C. McLean		50%	Farm Worker II

* On educational leave until March 15, 1988.

February 10, 1988.
PH/ci
ERDAPROJ.87#2

TABLE 1 . SWP 87 Y III (D) - 1987 DATA SUMMARY (WATROUS, NORTH BATTLEFORD, OUTLOOK, SYLVANIA, IRRICANA, OLDS, DOMAIN)

	ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%Np)	HEADING (DAYS)	MATURE (DAYS)	HEIGHT (CM)	TEST WT (KG/HL)	1000K (GM)	RUST RESIST LEAF	RUST RESIST STEM	PROTEIN %	NIRI
1.	NEEPAWA		R,HRS	100	50	100	88	76	36.1	100S	2R	14.5	103
2.	COLUMBUS		R,HRS	99	53	104	97	78	38.6	40M	5R-MR	15.2	106
3.	HY 320		R,CPS	118	52	106	75	76	39.8	20M	10MR	11.5	39
4.	FIELDER		W,SWS	120	54	107	79	74	38.1	40M	25MR	11.4	17
5.	OSLO		R,CPS	101	47	99	70	75	36.8	40M	2R-MR	12.8	51
6.	NORDIC			124	51	105	78	78	43.4	10R	10R-MR	11.9	82
7.	SWP 9521	N 066/BB.../5/RL 4137	W,CPS	108	47	98	75	76	40.2	60MS	2R	12.8	95
8.	SWP 9525	"	W,CPS	106	48	100	74	75	39.1	60M	2R	12.9	77
9.	SWP 9302	BB/3/TZPP/SN...	R,CPS	115	50	104	78	74	42.0	60MS	3R	12.3	71
10.	SWP 9249	6WA 693/HY 320	R,CPS	123	52	106	82	76	41.9	20MR	35MR/MS	12.3	61
11.	SWP 9253	HY 320/6WA 644	R,CPS	108	54	106	73	74	38.9	60MS	25MR/MS	11.7	64
12.	SWP 9255	"	R,CPS	123	52	105	75	75	42.8	60MS	15MR	11.6	76
13.	SWP 9256	"	R,CPS	110	54	105	74	75	39.8	100S	30MR/MS	11.5	74
14.	SWP 9301	BB/TZPP/SN---/4/HY 320	R,CPS	121	52	104	74	75	42.1	100S	15MR	11.8	75
15.	SWP 9303	"	R,CPS	118	49	102	77	75	39.9	40M	10R-MR	11.1	73
16.	SWP 9524	N 066/BB/5/RL 4137	W,CPS	100	48	98	73	74	38.1	10SS	5R-MR	11.2	82
17.	SWP 2590	HY 320/WRP 8-27	R,MIX	128	55	107	82	74	40.6	40M	3R-MR	11.2	85
18.	SWP 2599	HY 320/WRC 77-1	R,CPS	103	56	107	82	75	39.4	TR	25MR/MS	12.7	83
19.	SWP 1601	HY 320/WRC 77-1	R,CPS	128	52	104	75	77	42.1	40M	10MR	11.1	24
20.	SWP 1602	"	R,CPS	132	53	107	76	75	42.3	20MR	7MR	11.2	27
21.	SWP 1607	HY 320/ND 50	R,CPS	129	51	107	77	76	40.8	60MS	25MR	11.4	25
22.	SWP 1635	K 321/ND 50//WPB-3MW	R,CPS	127	52	106	78	75	42.8	40M	15MR	11.0	24
23.	SWP 2591	HY 320/WRP 8-27	R,MIX	130	54	107	88	76	42.0	TR	15MR	10.7	26
24.	SWP 9250	6WA 693/HY 320	R,CPS	113	51	104	83	73	40.6	60MS	10MR	12.8	66

TABLE2 SWP 87 Y II (L) - 1987 DATA SUMMARY (WATROUS & OUTLOOK)

	ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%CLMS)	LODG. (1-9)	HEADING (DAYS)	MATURITY (DAYS)	HEIGHT (CM)	TEST WT (KG/HL)	1000 K (GM)	RUST RESIST LEAF	RUST RESIST STEM	PROTEIN (%)	MIRI
1.	COLUMBUS		R,HRS	100	1.0	52	106	120	78	35.2	R/MR	R/MR	14.8	105
2.	OSLO		R,CPS	93	1.0	46	100	86	73	30.5	S	MR	13.3	44
3.	HY 320		R,CPS	112	2.0	52	104	90	77	34.4	R	MR	11.3	29
4.	FIELDER		W,SWS	103	1.0	53	106	96	75	30.8	MR	MR/MS	11.9	7
5.	SWP 2613	HY 912/WRP 8-27	R,HRS,L	88	1.0	51	103	93	72	35.7	MR/MS	MR	14.0	93
6.	SWP 2597	HY 320/WRC 77-1	LR,CPS	98	2.0	52	106	99	77	38.3	R	MR/MS	12.5	4
7.	SWP 2600	HY 320/WRC 77-2	R,CPS	93	1.0	52	106	102	77	37.8	R-MR	MR	13.2	5
8.	SWP 2601	"	R,CPS	92	2.0	51	104	92	77	38.0	TR-R	MR/MS	13.4	8
9.	SWP 1628	K321/ND50//WPB-3MW	W,CPS/SWS	93	1.0	46	98	83	78	35.2	S	MR/MS	13.8	95
10.	SWP 3887	HS 81742/RL 4137	R,CPS/HRS	93	1.0	46	98	83	78	35.2	S	MR/MS	13.8	95
11.	SWP 3889	FIELDER/HS 81742	W,CPS	103	1.0	49	103	92	76	35.3	MS	MR	12.1	99
12.	SWP 3892	"	W,MIX	87	1.0	47	98	99	72	34.6	MS	MR	11.8	2
13.	SWP 3893	"	W,CPS	90	1.0	47	98	98	76	32.7	MS	MR	11.1	0
14.	SWP 3895	"	W,MIX	104	1.0	48	104	103	77	35.2	S	MR	11.6	14
15.	SWP 3903	FIELDER/WRW 79-3 W	W,SWS	86	2.0	52	104	96	71	26.1	MR/MS	MR	10.6	20
16.	SWP 1608	HY 320/ND 50	LR,CPS	87	4.5	50	99	101	74	32.2	MR	MR/MS	12.1	61
17.	SWP 2607	HY 912/WRP 8-27	R,HRS,L	87	3.0	49	99	92	73	21.6	MS	MR	14.3	103
18.	SWP 2609	"	R,HRS,L	98	1.0	51	104	101	76	41.8	MS	MR	14.6	100
19.	SWP 730	HY 320/OXLEY	R,CPS	107	2.0	52	105	94	74	31.0	MR	MR/MS	14.6	-
20.	BSW	BRANCHED SPIKE	W,SWS	87	4.0	56	108	145	75	35.9	O-TR	MS-S	14.5	120
21.	BZ 684-9		W,MIX	77	1.0	49	102	84	69	26.8	MR	MR	11.9	0
22.	BZ 68422		W,MIX	92	1.0	50	101	90	70	26.1	MS-S	MR/MS	11.7	2
23.	BZ 684-23		W,MIX	89	1.5	51	103	92	72	33.6	MS	MR	11.4	4
24.	BZ 684-21		W,CPS	90	1.5	52	103	92	74	29.5	R-MR	R-MR	11.1	6

TABLE 3 SWP 87 Y I (16) - 1987 DATA SUMMARY (WATROUS, OUTLOOK)

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%Clms)		HEADING (DAYS)		MATURITY (DAYS)		HEIGHT (CM)		TEST WT. (KG/HL)	1000K (GM)		RUST RESIST		PROTEIN (%)		NIRI	
			WTR	OTL	WTR	OTL	WTR	OTL	WTR	OTL	OTL	WTR	OTL	LEAF	STEM	WTR	OTL	WTR	OTL
1. COLUMBUS		R,HRS	100	100	48	55	101	109	89	117	79	36.6	39.8	R-MR	R	14.2	14.6	79	105
2. HY 320		R,CPS	105	106	48	54	100	110	69	90	77	38.8	35.4	MR	MR/MS	11.2	10.6	37	33
3. OSLO		R,CPS	83	91	44	47	96	105	63	87	74	33.8	32.2	M	R	12.6	12.3	48	54
4. FIELDER		W,SWS	105	111	50	56	101	112	78	95	74	31.0	34.2	MS	R	11.4	10.8	13	14
5. BEZENCHUK		DUR	86	95	51	54	102	112	105	125 (L)	79	43.8	48.3	R-MR	MR/MS	15.3	14.7	124	117
6. BSW		W,SWS	93	88	55	58	103	113	119	145 (L)	73	37.8	35.8	MR	MR	13.4	13.3	127	120
7. SWP 3891	FIELDER/HS 81742	W,SWS	96	105	45	54	97	110	65	87	76	31.1	33.4	MS	R-MR	13.6	13.1	0	12
8. SWP 3896	"	W,CPS	71	93	45	49	99	108	73	105	77	38.6	34.6	MS-S	MR	11.8	11.4	97	99
9. SWP 3898	"	W,CPS	71	80	45	49	96	108	68	95	75	38.6	33.8	M	R	11.2	11.5	18	30
10. SWP 3904	FIELDER/WRW-79-3W	W,SWS	88	104	46	51	98	110	71	98	75	34.2	31.4	M	R-MR	11.5	10.7	17	17
11. SWP 3905	FIELDER/WRW-79-3W	W,SWS	83	95	45	52	96	107	71	95	73	31.6	28.8	M	MR	12.2	11.8	14	12
12. SWP 3907	"	W,SWS/CPS	73	98	45	53	96	111	68	96	74	31.0	28.2	R-MR	MR	12.1	11.8	21	16
13. SWP 3908	"	W,SWS	80	87	45	51	96	105	66	96	72	31.8	28.2	M	R	12.4	12.9	15	7
14. SWP 3909	"	W,SWS	77	87	46	54	98	106	69	99	75	33.0	27.8	M	R	12.1	12.4	17	14
15. SWP 3869	WRW-79-3W/RL4137	R,MIX	84	86	45	48	96	100	68	101	76	34.0	26.6	MR	R-MR	12.3	12.4	97	83
16. SWP 3874	WRW-79-3W/RL4137	R,MIX	85	94	47	51	97	102	76	106	77	32.0	28.6	R-MR	R	12.1	12.3	106	95
17. SWP 3905A	FIELDER/WRW-79-3W	W,SWS	84	93	48	54	99	112	72	98	73	32.6	25.4	R-MR	R	12.3	13.2	24	8
18. SWP 3905B	"	W,SWS	84	89	47	54	98	111	69	96	72	32.6	26.4	M	R-MR	11.8	13.1	18	6
19. SWP 3886	HS81742/RL4137	LR,MIX	81	86	48	54	99	108	68	99	72	34.0	31.0	M	R	10.5	10.7	9	3
20. SWP 3905C	FIELDER/WRW-79-3W	W,SWS	77	102	48	52	99	111	73	98	68	31.2	29.6	MR	MR	11.7	11.7	9	9
21. SWP 3905E	FIELDER/WRW-79-3W	W,SWS	93	93	49	55	101	110	72	96	69	30.1	28.4	R-MR	MR	11.8	11.9	13	15
22. SWP 3893	FIELDER/HS81742	W,CPS	82	93	45	48	96	106	60	93	70	31.2	34.8	R-MR	R-MR	13.4	12.8	5	15
23. NORDIC		R,MIX	94	114	48	52	100	109	62	95	75	36.2	40.8	R-MR	R-MR	12.0	11.3	85	97
24. OMSKAJA		AL,R,MIX	110	101	51	59	105	115	100	129	73	46.6	48.2	MR	S	12.4	11.3	110	89
Clms (g/plot)			2003	2497															
No. of Reps			2	2															
CV (%)			9.2	7.5															

TABLE 4 SWP 87 Y I (20) - 1987 DATA SUMMARY (WATROUS, OUTLOOK)

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%Clms)		HEADING (DAYS)		MATURITY (DAYS)		HEIGHT (CM)		1000K (GM)		RUST RESIST		(%)		NIRI	
			WTR	OTL	WTR	OTL	WTR	OTL	WTR	OTL	WTR	OTL	LEAF	STEM	WTR	OTL	WTR	OTL
1. OSLO		R,HRS	100	100	48	53	104	108	92	118	36.8	39.0	MR	R	14.1	16.0	117	111
2. HY 320		R,HRS	122	194	46	54	87	198	72	91	36.0	34.0	R-MR	MR/MS	10.9	10.8	44	36
3. OSLO		R,CPS	98	92	42	47	93	104	65	86	35.2	31.2	M	MR	12.2	12.9	54	52
4. SWP 4838	W 15962/HY 320	W,CPS/U	100	99	43	47	92	95	73	92	38.8	35.6	MS	R-MR	12.0	12.3	74	81
5. SWP 4842	15-61/HY 320	R,U/CPS	96	93	43	49	97	100	72	83	47.2	37.4	R-MR	R-MR	13.3	13.8	78	65
6. SWP 4844	15-61/HY 320	R,CPS	92	97	42	46	93	100	87	105	41.8	38.8	M	MR	11.5	11.8	100	100
7. SWP 4845	"	R,MIX	82	88	42	45	95	100	74	92	42.2	38.8	M	MR	13.5	13.4	100	93
8. SWP 4846	"	R,CPS/U	76	91	41	44	94	99	76	97	42.2	37.8	M	MR,GB	13.7	13.3	101	71
9. SWP 4847	"	R,CPS/U	101	103	43	47	94	105	85	108	41.0	34.6	MS	R-MR	11.5	10.5	97	52
10. SWP 4848	"	R,CPS	95	92	42	46	98	104	84	96	44.0	37.2	M	MR	11.9	12.3	87	76
11. SWP 4849	15-61/HY 320	R,MIX	86	89	42	48	95	101	66	90	44.4	35.2	MR	MR	13.7	13.8	79	73
12. SWP 4850	WRC 77-5/HY 320	R,CPS	90	93	42	47	93	101	68	84	39.6	34.4	M	MR	12.5	12.0	74	59
13. SWP 4851	"	R,CPS/U	76	87	42	48	92	100	65	88	45.4	31.0	R-MR	MR	12.5	12.0	74	59
14. SWP 4852	"	R,CPS/U	68	81	41	48	92	100	64	86	45.6	34.8	MR	MR	13.7	13.1	102	87
15. SWP 4853	"	R,CPS	100	96	42	47	94	100	67	84	39.6	34.6	MR	MR	12.4	12.2	59	39
16. SWP 4854	WRC 77-5/HY 320	R,U/CPS	77	86	42	48	97	100	68	88	44.8	34.6	R-MR	MR	13.5	13.1	88	68
17. SWP 4855	"	R,CPS	90	96	42	48	97	102	68	81	38.2	33.2	M-MS	MR	12.2	12.3	80	57
18. SWP 4856	"	R,CPS/U	80	85	42	47	95	100	66	84	39.4	37.0	R-MR	MR	13.6	13.7	77	63
19. SWP 4857	"	R,CPS	82	91	42	48	94	113	67	93	34.0	35.8	R-MR	R-MR	11.8	12.0	17	14
20. SWP 4858	PROSPUR/HY 320	R,CPS	107	109	46	53	98	108	76	93	34.2	34.0	R-MR	MR	11.6	11.2	76	84
21. SWP 4859	PROSPUR/HY 320	R,MIX	96	94	41	47	97	111	77	90	38.8	33.2	R-MR	MR	11.6	11.5	22	22
22. SWP 4862	"	R,CPS	101	95	42	46	97	109	79	97	38.4	34.0	R	MR	11.4	11.4	25	19
23. SWP 4863	"	R,CPS	101	104	42	47	96	112	80	97	34.6	35.0	R	MR	12.2	11.9	19	28
24. SWP 4864	HY 320//NURI/WALDRON	R,CPS	104	98	45	52	95	108	77	94	32.0	32.4	R-MR	MR	12.5	12.2	86	97
Clms (g/plot)			2120	2618														
No. of Reps			2	2														
CV (%)			10.6	9.1														

TABLE 5 SWP 87 Y I (21) - 1987 DATA SUMMARY (WATROUS & OUTLOOK)

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%Clms)		HEADING (DAYS)		MATURITY (DAYS)		HEIGHT (CM)		1000K (GM)		RUST RESIST		(%)		NIRI	
			WTR	OTL	WTR	OTL	WTR	OTL	WTR	OTL	WTR	OTL	LEAF	STEM	WTR	OTL	WTR	OTL
1. COLUMBUS		R,HRS	100	100	49	55	100	112	93	118	37.4	42.0	R-MR	R	14.1	15.4	119	113
2. HY 320		R,CPS	111	103	48	55	99	110	77	91	33.6	34.8	MR	MR/MS	11.0	10.7	28	36
3. OSLO		R,CPS	87	88	43	48	94	105	68	85	32.2	32.0	M	MR	12.1	13.1	49	54
4. SWP 4865	HY 320//NURI/WALDRON	R,CPS	102	83	47	54	96	110	76	96	31.0	29.2	R-MR	MR	12.4	12.6	95	84
5. SWP 4866	"	R,CPS	113	103	51	57	105	114	93	106	42.4	42.4	R	MR	10.9	11.5	28	30
6. SWP 4867	HY 320//NURI/WALDRON	R,MIX	80	100	43	48	97	104	72	94	40.2	36.6	M	MR	12.4	12.3	79	91
7. SWP 4868	"	R,CPS	96	97	43	53	100	112	94	106	42.6	40.6	R-MR	MR	10.8	11.6	28	38
8. SWP 4870	ERA/2*PROTOR//HY 320	R,CPS	114	114	47	54	101	109	78	97	38.4	37.4	R-MR	MR/MS	11.6	11.2	66	91
9. SWP 4871	"	R,CPS	111	107	47	54	101	111	76	96	37.2	37.2	R-MR	MR	11.4	11.6	79	68
10. SWP 4872	"	R,CPS	74	84	43	50	94	109	70	93	38.6	39.6	R-MR	MR	12.9	12.2	62	81
11. SWP 4876	NO66/BB/3/CNO//..../HY 320	R,MIX	79	91	46	53	101	112	74	91	35.4	35.6	MR	MR	12.7	12.4	100	111
12. SWP 4877	"	R,CPS	79	85	47	55	98	110	76	101	35.4	31.6	M	R-MR	10.7	11.2	12	15
13. SWP 4879	6WA644/RL 4137	R,SWS	84	97	44	50	93	109	66	84	35.6	32.8	S	R-MR	12.8	13.1	45	64
14. SWP 4885	ERA/2*PROTOR//RL 4137	R,SWS	70	82	45	50	92	106	69	94	39.0	39.8	R-MR	R-MR	13.3	13.2	70	80
15. SWP 4889	BB/3/TZPP/SN//NAPO/4/RL 4137	W,SWS	63	81	43	48	92	103	72	98	34.0	37.4	M	R-MR	13.8	13.0	62	66
16. SWP 4891	BB/3/TZPP/SN//NAPO/4/RL 4137	R,MIX	63	80	44	48	93	103	68	95	29.4	31.4	MR	R-MR	13.2	12.7	82	91
17. SWP 4905	W 15962/HY 320	W,CPS	105	111	49	57	102	114	80	105	37.0	37.6	R-MR	MR	12.0	11.5	57	62
18. SWP 4907	HY 320/6WA693	R,CPS	91	89	47	55	95	110	73	93	32.2	32.8	M	MR/MS	11.7	11.7	67	83
19. SWP 4909	"	R,CPS	85	83	45	54	97	110	72	90	32.2	30.8	M	MR/MS	12.2	12.1	70	64
20. SWP 4910	HY 320/6WA644	R,CPS	102	101	46	55	98	108	71	95	35.4	33.8	MR	MR	11.1	11.0	80	76
21. SWP 4911	HY 320/6WA644	R,CPS	99	96	46	54	98	110	71	89	33.6	32.6	MR	MR	11.1	11.1	62	62
22. SWP 4913	15-61/HY 320	R,CPS	97	89	47	52	97	110	83	114	37.0	43.6	R-MR	MR	12.2	12.0	11	27
23. SWP 4914	"	R,CPS	100	91	47	52	97	110	83	114	34.6	41.4	R-MR	MR	11.8	11.2	8	33
24. SWP 4915	"	R,CPS	90	105	47	52	97	111	84	115	37.4	44.4	MR	MR	12.0	11.8	9	28
Clms (g/plot)			2087	2751														
No. of Reps			2	2														
CV (%)			7.5	9.0														

TABLE 6 SWP 87 Y I (22) - 1987 DATA SUMMARY (WATROUS, OUTLOOK)

	ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%Clms)		HEADING (DAYS)		MATURITY (DAYS)		HEIGHT (CM)		TEST WT. (KG/HL)	1000K (GM)		RUST RESIST		PROTEIN (%)		NIRI	
				WTR	OTL	WTR	OTL	WTR	OTL	WTR	OTL	OTL	WTR	OTL	LEAF	STEM	WTR	OTL	WTR	OTL
1.	COLUMBUS		R,HRS	100	100	50	56	97	110	92	118	80	34.0	39.4	R-MR	R-MR	14.5	15.2	111	122
2.	HY 320		R,CPS	108	100	48	55	97	110	73	88	76	34.6	33.6	MR	MR	11.1	10.6	41	45
3.	SWP 4916	15-61/HY 320	R,CPS	95	97	46	54	95	109	78	111	80	37.0	40.2	MR	MR	12.1	11.9	22	31
4.	SWP 4917	CNO/SN//TZPP/.../HY 320	R,CPS	98	91	48	55	102	111	79	102	74	37.6	33.0	MR	MR/MS	11.5	11.4	98	74
5.	SWP 4918	"	R,CPS	105	101	48	54	97	112	81	100	75	37.8	37.2	MR	MR/MS	11.7	11.4	82	83
6.	SWP 4919	CNO/SN//TZPP/.../HY 320	R,CPS	96	85	47	55	96	111	78	98	73	37.4	35.0	MR	MR	11.7	11.9	75	73
7.	SWP 4922	"	R,CPS	99	97	46	54	96	112	75	100	75	38.2	37.4	MR/MS	MR/MS	11.6	11.6	88	85
8.	SWP 4923	"	R,CPS	101	94	46	54	99	111	74	93	71	33.0	31.8	MR	MR/MS	11.8	11.8	79	69
9.	SWP 4924	"	R,CPS	106	95	47	54	101	112	77	102	73	35.6	36.6	R-MR	MR/MS	11.9	11.6	88	93
10.	SWP 4925	HY 320//NURI/WALDRON	R,CPS	73	83	45	54	96	111	76	98	73	34.4	34.6	R-MR	MR	11.9	11.7	26	36
11.	SWP 4926	HY 320//NURI/WALDRON	R,CPS	80	82	45	54	95	113	75	96	70	33.2	33.0	R-MR	MR	12.1	12.1	30	36
12.	SWP 4927	"	R,CPS	69	82	43	51	93	104	72	95	71	35.8	32.4	M	MR	12.0	11.7	17	22
13.	SWP 4929	"	R,CPS	66	76	45	54	96	109	77	99	71	32.0	32.6	R-MR	R-MR	12.4	12.2	13	21
14.	SWP 4930	"	R,CPS	70	78	43	54	96	112	78	98	71	36.8	36.4	R-MR	MR	12.1	12.6	21	18
15.	SWP 4931	"	R,CPS	75	83	43	51	94	104	73	100	71	33.4	32.6	MR	MR	12.2	11.3	27	17
16.	SWP 4934	HY 320//NURI/WALDRON	R,CPS	67	72	45	54	93	110	74	94	66	32.8	29.0	MR	R-MR	12.4	11.9	12	16
17.	SWP 4935	"	R,CPS	106	117	50	57	103	114	89	99	76	36.8	39.6	R-MR	MR/MS	11.7	11.4	23	20
18.	SWP 4943	ERA/2*PROTOR//HY 320	R,CPS	104	105	45	52	99	106	75	95	75	36.2	35.2	R-MR	MR	12.2	12.7	91	91
19.	SWP 4944	"	R,CPS	102	96	46	53	98	113	75	94	75	32.8	35.6	R-MR	R-MR	12.5	12.7	99	92
20.	SWP 4945	"	R,CPS	100	99	45	52	100	113	78	98	74	34.0	35.8	R-MR	R-MR	12.2	12.7	83	83
21.	SWP 4946	ERA/2*PROTOR//HY 320	R,CPS	99	95	47	52	98	112	78	96	75	34.3	35.2	R-MR	R-MR	12.5	12.5	91	103
22.	SWP 4947	"	R,CPS	101	104	45	51	94	112	77	99	74	35.4	34.2	MR	MR	12.2	12.7	98	108
23.	SWP 4949	"	R,CPS	101	108	46	53	98	114	79	102	75	35.4	37.4	R-MR	MR	12.3	12.7	79	91
24.	OSLO		R,CPS	98	112	43	48	92	107	69	89	76	33.8	34.8	M	MR	12.1	12.7	71	57
Clms (g/plot)				2016	2683															
No. of Reps				2	2															
CV (%)				8.1	6.9															

TABLE 7 SWP 87 Y I (23) - 1987 DATA SUMMARY (WATROUS & OUTLOOK)

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%Clms)		HEADING (DAYS)		MATURITY (DAYS)		HEIGHT (CM)		1000K (GM)		RUST RESIST		(%)		NIRI	
			WTR	OTL	WTR	OTL	WTR	OTL	WTR	OTL	WTR	OTL	LEAF	STEM	WTR	OTL	WTR	OTL
1. COLUMBUS		R,HRS	100	100	49	55	102	110	82	113	36.8	40.6	R-MR	R-MR	14.3	12.5	102	117
2. HY 320		R,CPS	109	107	48	55	100	111	79	91	35.2	38.0	M	MR	10.6	10.2	37	58
3. OSLO		R,CPS	86	95	43	48	94	106	76	85	34.4	34.0	M	R-MR	12.1	12.1	53	61
4. SWP 4950	ERA/2*PROTOR//HY 320	R,CPS	85	92	45	51	96	106	77	94	36.8	38.0	MR	R-MR	12.2	11.8	86	95
5. SWP 4951	"	R,CPS	85	102	47	51	101	107	82	95	35.0	35.6	MR	MR	11.8	11.5	86	83
6. SWP 4955	PROSPUR/RL 4137	R,SWS	81	72	47	50	97	102	79	101	36.6	34.2	M	MR	11.4	12.8	70	67
7. SWP 4959	NO66/BB/..../RL 4137	W,CPS	78	79	43	48	94	103	72	90	36.6	35.8	M	R-MR	12.8	13.1	76	85
8. SWP 4962	"	W,CPS	105	106	46	52	98	108	77	98	40.8	40.0	MR	R-MR	11.0	11.5	68	87
9. SWP 4963	"	W,CPS	89	97	48	53	98	109	75	96	39.2	39.0	R-MR	R-MR	11.2	11.7	84	96
10. SWP 4964	"	W,CPS	95	97	45	50	96	106	77	93	40.2	38.0	M	R-MR	11.7	12.0	86	88
11. SWP 4965	NO66/BB/..../RL 4137	W,CPS	97	101	45	51	95	107	83	99	38.8	39.6	MR	R-MR	11.5	11.2	77	91
12. SWP 4966	"	W,CPS	78	91	43	48	94	104	79	92	37.4	38.6	M	R-MR	12.8	12.0	74	87
13. SWP 4967	"	W,CPS	84	92	44	49	93	107	76	94	37.0	38.4	R-MR	R-MR	11.6	11.8	71	76
14. SWP 4933	HY 320//NURI/WALDRON	R,CPS	63	82	46	52	96	109	83	96	33.6	36.0	R-MR	R-MR	11.1	10.9	14	34
15. SWP 4970	NO66/BB/..../RL 4137	W,CPS	88	102	44	48	93	104	85	92	36.0	37.4	MR	R-MR	11.3	11.5	72	101
16. SWP 4971	NO66/BB/..../RL 4137	W,CPS	87	98	45	48	92	104	86	89	39.0	38.8	MR	R	11.3	11.3	85	105
17. SWP 4972	"	W,CPS	81	111	45	49	94	103	84	89	39.4	38.4	MR	R	11.7	10.8	70	93
18. SWP 4973	"	W,CPS	75	88	44	49	91	104	78	86	34.4	35.4	MR	R-MR	11.8	11.3	59	80
19. SWP 4974	"	W,CPS	68	87	45	50	93	105	88	93	38.0	38.0	MR	R-MR	12.0	11.6	62	78
20. SWP 4975	"	W,CPS	96	113	49	55	99	111	81	98	39.2	41.2	R	MR	11.5	10.9	88	98
21. SWP 4979	K 321/6WA693	W,CPS	82	88	44	48	100	110	78	98	39.6	42.0	R-MR	R	13.4	13.2	88	107
22. SWP 4985	HY 320/6WA693	R,CPS	91	89	50	56	103	110	71	87	34.8	32.2	R-MR	R-MR	11.3	10.8	25	28
23. SWP 4987	"	R,CPS	91	102	49	56	102	110	77	90	36.2	35.0	R	R-MR	11.0	10.7	26	39
24. SWP 4988	"	R,CPS	109	105	49	56	102	110	78	90	37.8	36.6	R	R	10.7	9.5	22	39
Clms (g/plot)			2405	1575														
No. of Reps			2	2														
CV (%)			6.6	6.5														

TABLE 8 SWP 87 Y I (24) - 1987 DATA SUMMARY (WATROUS & SYLVANIA)

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%Clms) WTR	YIELD (%Clms) SYL	HEADING (DAYS) WTR	HEADING (DAYS) SYL	MATURITY (DAYS) WTR	HEIGHT (CM) WTR	1000K (GM) WTR	1000K (GM) SYL	RUST RESIST LEAF	RUST RESIST STEM	(%) WTR	(%) SYL	MIRI WTR	MIRI SYL
1. COLUMBUS		R,HRS	100	100	49	54	104	97	39.0	38.0	R-MR	R-MR	14.2	12.0	119	94
2. HY 320		R,CPS	114	143	48	51	101	76	37.0	42.2	MR	MR	10.5	12.2	46	105
3. OSLO		R,CPS	84	106	44	50	92	71	31.6	34.6	M	R-MR	12.4	10.7	45	83
4. SWP 4989	HY 320/6WA693	R,CPS	114	142	49	52	101	83	39.2	43.8	R-MR	R-MR	10.9	10.2	30	71
5. SWP 4991	"	R,CPS	119	147	49	51	101	83	37.4	42.6	MR	R-MR	10.8	9.7	20	37
6. SWP 4992	HY 320/6WA693	R,MIX	104	130	50	52	103	79	35.8	36.6	R-MR	R-MR	10.2	9.4	24	55
7. SWP 4993	"	R,MIX	114	124	49	53	104	78	35.2	35.4	R	R-MR	10.4	10.0	29	49
8. SWP 4994	"	R,CPS	104	141	51	53	105	82	36.0	36.8	R	MR	10.2	9.6	25	47
9. SWP 4995	"	R,MIX	106	127	49	53	104	81	33.0	35.2	R-MR	R-MR	10.8	9.5	16	46
10. SWP 4997	"	R,CPS	109	144	49	53	103	85	36.0	40.8	R-MR	MR	10.9	9.7	22	40
11. SWP 4998	HY 320/6WA693	R,CPS	119	132	49	52	101	82	35.2	41.8	R-MR	MR	10.3	9.7	42	69
12. SWP 4999	"	R,CPS	78	70	42	49	100	77 (L)	43.2	41.2	R-MR	R	12.3	12.1	70	86
13. SWP 4002	"	R,MIX	85	92	46	51	98	72	30.8	42.1	MR	R-MR	11.3	11.0	89	101
14. SWP 4003	"	R,MIX	121	104	49	53	107	84	35.8	42.4	M	R-MR	11.0	11.0	88	91
15. SWP 4007	"	R,CPS	115	131	48	52	103	87	37.0	45.2	R-MR	MR	11.4	9.8	21	32
16. SWP 4009	HY 320/6WA693	R,CPS	104	146	48	51	102	86	36.2	43.2	M	R-MR	11.2	9.6	18	39
17. SWP 4010	"	R,CPS	108	143	49	53	104	79	34.0	36.0	M	R-MR	10.8	10.0	32	58
18. SWP 4015	6WA693/HY 320	R,HRS	91	74	47	52	102	92	41.0	45.2	MR	R-MR	13.0	12.9	84	81
19. SWP 4022	HY 320/6WA644	R,CPS	115	129	48	54	102	79	37.0	46.0	M	MR	10.5	10.7	63	98
20. SWP 4023	"	R,CPS	119	128	48	53	101	77	36.4	41.2	M	MR	10.8	9.8	67	91
21. SWP 4024	HY 320/6WA644	R,CPS	115	122	49	53	101	76	37.0	41.2	R-MR	MR/MS	10.8	10.3	69	89
22. SWP 4025	"	R,CPS	122	152	48	54	102	78	39.2	45.0	R-MR	MR	10.3	10.3	80	95
23. SWP 4026	"	W,CPS	96	135	45	50	92	76	37.8	37.8	MR/MS	R-MR	11.9	10.2	75	100
24. SWP 4027	"	R,CPS	97	143	44	50	91	74	37.4	33.8	MR/MS	R-MR	11.5	10.4	89	106
Clms (g/plot)			2214	600												
No. of Reps			2	4												
CV (%)			6.7	13.4												

TABLE 9 SWP 87 Y I (25) - 1987 DATA SUMMARY (WATROUS & SYLVANIA)

ENTRY	PEDIGREE	KERNEL TYPE	YIELD (%Clms) WTR	YIELD (%Clms) SYL	HEADING (DAYS) WTR	HEADING (DAYS) SYL	MATURITY (DAYS) WTR	HEIGHT (CM) WTR	1000K (GM) WTR	1000K (GM) SYL	RUST RESIST LEAF	RUST RESIST STEM	(%) WTR	(%) SYL	MIRI WTR	MIRI SYL
1. COLUMBUS		R,HRS	100	100	48	53	101	93	36.4	40.6	R	R-MR	14.1	13.9	109	145
2. HY 320		R,CPS	110	155	46	51	97	73	34.6	45.4	R-MR	MR	10.6	9.2	41	74
3. OSLO		R,CPS	86	128	43	50	94	67	33.2	37.6	MR/MS	R-MR	12.1	9.9	61	75
4. SWP 4028	HY 320/908 R	R,CPS	100	160	43	51	94	69	34.8	35.6	MR	R	12.0	9.1	85	130
5. SWP 4033	"	R,CPS	104	150	45	50	93	72	37.6	37.8	MR/MS	R	11.3	9.4	78	104
6. SWP 4035	HY 320/908 R	R,CPS	85	132	44	50	92	89	34.0	36.0	MS	R-MR	12.1	9.4	77	112
7. SWP 4046	CNO/SN//..../HY 320	R,MIX	114	146	45	50	106	86	41.2	42.6	MR	MR	10.6	10.6	98	93
8. SWP 4051	"	R,CPS/U	115	140	43	51	101	73	42.2	42.4	MR	MR	11.6	10.0	89	103
9. SWP 4055	WRC 77-3/RL 4137	R,CPS	105	149	44	51	101	69	35.6	40.2	MR	R-MR	13.5	10.4	88	82
10. SWP 4058	"	R,MIX	85	152	43	50	97	80	39.4	38.2	MR	MR	12.8	10.9	78	92
11. SWP 4059	WRC 77-3/RL 4137	R,CPS/U	76	148	45	51	99	71	46.2	43.6	MR/MS	R-MR	14.3	10.3	104	93
12. SWP 4063	"	R,CPS	86	173	43	52	96	70	42.6	42.0	R-MR	R-MR	12.8	10.1	86	80
13. SWP 4064	"	R,CPS	75	135	43	50	99	74	40.8	42.0	R-MR	MR	13.0	10.5	113	83
14. SWP 3885A	HS 81742/RL 4137	R,MIX	87	138	45	51	96	74	31.6	33.4	MR	R-MR	12.2	10.4	93	102
15. SWP 3885B	"	R,CPS	92	148	45	51	96	73	32.2	36.4	MR	R	12.0	10.2	101	105
16. SWP 3885H	HS 81742/RL 4137	R,CPS	93	163	44	50	93	84	34.0	33.8	R-MR	R-MR	12.2	10.1	88	91
17. SWP 3890D	FIELDER/HS 81742	R,MIX	124	162	47	51	101	89	33.8	34.0	R-MR	R-MR	9.4	8.4	23	61
18. SWP 3961A	"	R,HRS	104	170	45	51	101	78	32.8	40.2	MR	R	11.1	8.9	95	117
19. SWP 3896C	"	R,CPS	93	149	47	50	103	88	35.4	44.6	MR/MS	R-MR	10.1	9.8	118	113
20. SWP 3896E	"	R,CPS	96	161	43	50	96	79	38.2	40.0	MR	R-MR	10.8	9.2	92	116
21. SWP 3896F	FIELDER/HS 81742	R,CPS	101	148	46	51	101	83	33.4	37.8	R-MR	MR	10.8	8.8	98	120
22. SWP 3896G	"	R,CPS/U	96	129	45	51	100	83	38.0	41.4	MR	MR	10.4	10.0	105	114
23. SWP 3896H	"	W,CPS	99	133	44	51	97	82	35.4	38.8	M	R-MR	10.4	9.1	91	106
24. SWP 3904A	FIELDER/WRW-79-3W	R,MIX	85	195	48	54	101	81	31.2	36.0	R-MR	MR	10.7	9.1	18	41
Clms (g/plot)			1947	574												
No. of Reps			2	4												
CV (%)			13.0	7.6												

Table 10. CPS F4 SELECTIONS, 1987.

CROSS	PEDIGREE	NO. OF SELECTIONS
85201	HY 912/HY 320	28
85202	HY 320/QT 8132	7
85203	SWP 9520/SWP 780191	19
85204	SWP 9520/QT 8132	2
85205	SWP 780191/SWP 9520	16
85206	SWP 780191/HY 912	5
81201	HY 320/SUW 797-1	15
81202	HY 320/OXLEY	4
81204	HY 320/ND 50	1
81209	K 321/SUW 797-1	1
81210	K 321/OXLEY	3
80225	HY 320/OXLEY	13
80230	HY 320/ND 50	2
80431	906R/S41529	2
79202A	HY 320/6WA693	40
79202B	6WA693/HY 320	35
79203A	HY 320/6WA644	52
79203B	6WA644/HY 320	58
79205A	HY 320/908 R	6
79206B	15-61/HY 320	15
79208A	HY 320/WRC 77-5	7
79208B	WRC 77-5/HY 320	4
79209B	PROSPUR/HY 320	35
79210B	CNO/SN//TZPP/NAPO/3/HY 320	6
79211A	HY 320/3/AT 66/CMN//POLK/ROQUE	11
79211B	AT 66/CMN//POLK/ROQUE/3/HY 320	5
79212B	NURI/WALDRON//HY 320	23
79213B	ERA/2*PROTOR//HY 320	16
79214B	BB/3/TZPP/SN//NAPO/4/HY 320	24
79215B	NO66/BB/3/CNO//NAD/CHR/4/7C/5/HY 320	27
79606A	6WA693/RL 4137	1
79606B	RL 4137/6WA693	1
79607A	RL 4137/6WA644	1
79628A	6WA644/K 321	1
		486

CPS F2 SELECTIONS, 1987. (CONTINUED)

CROSS	PEDIGREE	NO. OF SELECTIONS
86233	SWP 730/SWP 9525	17
86234	SWP 9525/RL 4137	13
86235	HY 358/HY 912	1
86236	HY 358/SWP 9525	1
86238	HY 358/NORDIC	67
86239	HY 358/WHEATON	3
86240	HY 912/SWP 9525	5
86242	HY 912/SWP 9254	2
86243	HY 912/HY 352	18
86244	OSLO/SWP 9302	18
86245	OSLO/SWP 757	29
86246	OSLO/SWP 9525	6
86247	WHEATON/SWP 9525	2
86248	NORDIC/SWP 9254	11
86250	NORDIC/SWP 9525	3
86251	NORDIC/SWP 9520	3
86252	NORDIC/SWP 9249	5
86254	SWP 9249/85U0674	6
86255	SWP 9254/85U0674	2
86257	SWP 9254/SWP 9525	9
86258	SWP 757/RL 4137	13
86259	HY 352/SWP 9525	15
86260	CAJEME/SWP 9254	4
86261	CAJEME/HY 912	1
86262	CAJEME/SWP 9520	14
86263	NORDIC/SWP 757	7
86264	SWP 9525/OSLO	10
86266	OSLO*2/HY 358	5
86267	HY 320//HY 358/NORDIC	13
86269	HY 320/VEERY #2	7
86270	HY 320/KEA "S"	3
86271	HY 320/SWP 9520//HY 358/NORDIC	11
86272	HY 320/SWP 9520//WHEATON/OSLO	3
86273	HY 320/85U0674//TAN "S"	6
86275	HY 320/WHEATON//OSLO	11
86276	NORDIC/HY 320//VEERY #2	5
86277	NORDIC/HY 320//TAN "S"	12
86278	WHEATON/OSLO//HY 320/SWP 9520	2
86279	HY 358*2/OSLO	9
86280	TAN "S"//HY 320/WHEATON	3
86281	TAN "S"//SWP 9254/OSLO	9
86282	TAN "S"/OSLO	9
86283	VEERY #2/HY 320	6
86284	VEERY #2//HY 320/WHEATON	6
86285	HY 358/HY 912//HY 320	11
		1,050

Table 11. CPS F2 SELECTIONS, 1987.

CROSS	PEDIGREE	NO. OF SELECTIONS
86201	HY 320/OSLO	15
86202	HY 320/HY 362	10
86204	HY 320/SWP 757	20
86205	SWP 757/HY 320	33
86206	HY 320/SWP 780191	4
86207	SWP 780191/HY 320	44
86208	HY 320/SWP 9520	6
86209	SWP 9520/HY 320	16
86210	HY 320/SWP 9525	4
86211	SWP 9525/HY 320	43
86212	HY 320/85U0674	11
86213	HY 320/WHEATON	20
86214	WHEATON/HY 320	41
86215	NORDIC/HY 320	20
86216	HY 358/HY 320	2
86217	HY 912/OSLO	18
86218	HY 352/OSLO	1
86220	OSLO/RL 4137	17
86221	SWP 9249/OSLO	45
86222	SWP 9254/OSLO	16
86223	OSLO/85U0674	24
86224	HY 362/OSLO	4
86225	WHEATON/OSLO	13
86227	NORDIC/OSLO	6
86228	SWP 730/OSLO	39
86229	HY 358/OSLO	60
86230	CAJEME/OSLO	62
86231	HY 320/CAJEME	30
86232	SWP 9249/SWP 9525	10

Table 12. SWS F2 SELECTIONS, 1987.

CROSS	PEDIGREE	NO. OF SELECTIONS
86601	OWENS/FIELDER	22
86602	FIELDER/OWENS	20
86603	SWP 735/FIELDER	30
86604	SWP 746/FIELDER	19
86605	FIELDER/SWP 9603	9
86606	FIELDER/CI 682-70	12
86607	SWP 734/FIELDER	38
86608	FIELDER/SWP 9535	24
86609	SWP 9535/FIELDER	25
86610	FIELDER/SWP 9487	16
86611	FIELDER/POTAM	19
86612	POTAM/FIELDER	11
86613	FIELDER/SWP 770	8
86614	HY 402/FIELDER	34
86615	FIELDER/OSLO	24
86617	FIELDER/KEWELL	6
86618	FIELDER/OLYMPIC	32
86619	FIELDER/INSIGNIA	28
86620	FIELDER/LANCE	22
86621	OWENS/CI 682-70	10
86622	OWENS/SWP 9487	21
86623	SWP 9603/OWENS	15
86624	SWP 7461/OWENS	5
86625	FIELDER*2/POTAM	12
86626	FIELDER*2/LANCE	12
86628	FIELDER/VEERY#2	33
86629	BZ 684-24//SWP 9603/OWENS	5
86631	BZ 864-24//FIELDER/POTAM	24
86632	BZ 684-24//FIELDER/INSIGNIA	21
86633	BZ 684-24//SWP 734/FIELDER	8
86634	BZ 684-24/VEERY #2	29
86635	FIELDER/SWP 9535//FIELDER/POTAM	11
86636	FIELDER/SWP 9535//FIELDER/OSLO	18
86637	FIELDER/POTAM//OWENS/SWP 9487	12
86638	FIELDER/OSLO//SWP 9603/OWENS	9
86639	FIELDER/LANCE//OSLO	10
86640	OWENS/FIELDER//FIELDER/LANCE	13
		657

Table 13. 1987 WINTER CROSSES

	SWP NO.	PEDIGREE	NO. OF SEEDS
1.	87201	OSLO X 86230	11
2.	87202	OSLO X 86243	6
3.	87203	OSLO X 86258	9
4.	87204	OSLO X 86259	22
5.	87205-83	OSLO X 86265 - 83	6
6.	87205-85	OSLO X 86165 - 85	1
7.	87205-88	OSLO X 86265 - 88	4
8.	87205-89	OSLO X 86265 - 89	4
9.	87205-91	OSLO X 86265 - 91	1
10.	87205-94	OSLO X 86265 - 94	5
11.	87205-95	OSLO X 86265 - 95	1
12.	87205-96	OSLO X 86265 - 96	5
13.	87205-98	OSLO X 86265 - 98	2
14.	87205-99	OSLO X 86265 - 99	16
15.	87205-100	OSLO X 86265 - 100	10
16.	87205-102	OSLO X 86265 - 102	9
17.	87205-104	OSLO X 86265 - 104	8
18.	87205-105	OSLO X 86265 - 105	3
19.	87205-107	OSLO X 86265 - 107	4
20.	87206-108	OSLO X 86266 - 108	5
21.	87206-109	OSLO X 86266 - 109	3
22.	87207	OSLO X 86268	3
23.	87208	OSLO X 86284	3
24.	87208-171	OSLO X 86284 - 171	7
25.	87209	OSLO X SUN 56A	51
26.	87210	OSLO X SWP 2604	54
27.	87211	OSLO X SWP 9521	5
28.	87212	NORDIC X 86201	10
29.	87213	NORDIC X 86204	59
30.	87214	NORDIC X 86215	1
31.	87215	NORDIC X 86223	7
32.	87216	NORDIC X 86228	9
33.	87217	NORDIC X 86230	15

	SWP NO.	PEDIGREE	NO. OF SEEDS
34.	87218	NORDIC X 86238	17
35.	87219	NORDIC X 86265	18
36.	87219-85	NORDIC X 86265 - 85	11
37.	87219-92	NORDIC X 86265 - 92	8
38.	87219-97	NORDIC X 86265 - 97	7
39.	87219-104	NORDIC X 86265 - 104	3
40.	87220	NORDIC X 86267	15
41.	87220-114	NORDIC X 86267 - 114	13
42.	87221	NORDIC X 86268	10
43.	87222	NORDIC X 86270	4
44.	87223	NORDIC X 86271	9
45.	87224	NORDIC X 86276	20
46.	87225	NORDIC X 86279	39
47.	87226	NORDIC X 86285	5
48.	87227	NORDIC X 85204	1
49.	87228	NORDIC X 85207	11
50.	87229	NORDIC X SWP 9521	10
51.	87230	NORDIC X ARIN	27
52.	87231	SWP 2604 X OSLO	3
53.	87232	SWP 9249 X 86208	17
54.	87233-86	SWP 9249 X 86265 - 86	1
55.	87233-87	SWP 9249 X 86265 - 87	7
56.	87233-92	SWP 9249 X 86265 - 92	5
57.	87233-96	SWP 9249 X 86265 - 96	3
58.	87233-107	SWP 9249 X 86265 - 107	5
59.	87234-108	SWP 9249 X 86266 - 108	7
60.	87235	SWP 9249 X 86267	8
61.	87236	SWP 9249 X 86269	9
62.	87237	SWP 9249 X 86279	16
63.	87238	SWP 9249 X 86281	1
64.	87239	SWP 9249 X SWP 2604	13
65.	87240	SWP 9249 X ARIN	24
66.	87241	SWP 9249 X NORDIC	3
67.	87242	SWP 9302 X 86238	26
68.	87243-97	SWP 9302 X 86265 - 97	14

	SWP NO.	PEDIGREE	NO. OF SEEDS
69.	87243-100	SWP 9302 X 86265 - 100	1
70.	87243-105	SWP 9302 X 86265 - 100	7
71.	87244-124	SWP 9302 X 86268 -124	5
72.	87245	SWP 9302 X 86269	4
73.	87246	SWP 9302 X 86279	2
74.	87247	SWP 9302 X SWP 9521	2
75.	87248	SWP 9521 X 86204	24
76.	87249	SWP 9521 X 86223	12
77.	87250	SWP 9521 X 86240	3
78.	87251	SWP 9521 X 86258	4
79.	87252	SWP 9521 X 86259	4
80.	87253	SWP 9521 X 85204	24
81.	87254	SWP 9521 X SWP 9249	2
82.	87255	SWP 9521 X ARIN	3
83.	87256	SWP 9521 X OSLO	4
84.	87257	SWP 9521 X SUN 56A	68
85.	87258	85204 X SWP 9521	17
86.	87259	KATEPWA X ARIN	30
86A.	87260	SWP 9249 X LETH. BT	3
87.	87601	FIELDER X 85203	11
88.	87602-85	FIELDER X 86265 - 85	1
89.	87603	FIELDER X 86606	5
90.	87604	FIELDER X SUN 56A	80
91.	87605	FIELDER X SWP 1601	141
92.	97606	FIELDER X SWP 2591	9
93.	87607	FIELDER X SWP 2604	2
94.	87608	FIELDER X SWP 9521	1
95.	87609	SWP 9521 X FIELDER	1
96.	87610	SWP 1601 X FIELDER	7
97.	87611	SWP 1601 X SUN 56A	9

86201 = HY 320/OSLO
86204 = HY 320/SWP 757
86208 = HY 320/SWP 9520
86215 = NORDIC/HY 320
86223 = OSLO/8540674
86228 = SWP 730/OSLO
86230 = CAJEME/OSLO
86238 = HY 358/NORDIC
86240 = HY 912/SWP 9525
86243 = HY 912/HY 352
86258 = SWP 757/RL 4137
86259 = HY 352/SWP 9525
86606 = FIELDER/CI 682-70
86265 = OSLO*2/RL 4137
86266 = OSLO*2/HY 358
86267 = HY 320/HY 358/NORDIC
86268 = HY 320//OSLO/RL 4137
86269 = HY 320/VEERY #2
86270 = HY 320/KEA "S"
86271 = HY 320/SWP 9520//HY 358/NORDIC
86276 = NORDIC/HY 320//VEERY #2
86279 = HY 358/*2 OSLO
86281 = TAN "S"//SWP 9254/OSLO
86284 = VEERY #2//HY 320/WHEATON
86285 = HY 358/HY 912//HY 320

1987 CPS - SUMMER CROSSING PROGRAM

Table 14.

CROSS #	PEDIGREE	SEEDS HARVESTED	SEED TO G.R.	SEED TO W.N.
87261	Nordic/Ltbr.	39	8	31
87262	Nordic/Norstar	288	10	130
87263	Nordic/Oslo	72	8	64
87264	Nordic/U761-J4-B6-B1	6	6	0
87265	Nordic/SWP 2590	6	6	0
87266	* Nordic/SWP 2599	26	6	20
87267	Nordic/SWP 2607	16	8	8
87268	* Nordic/SWP 9302	49	12	17
87269	Oslo/Norstar	89	8	81
87270	Oslo/U761-J4-B6-B1	82	10	72
87271	* Oslo/SWP 2599	23	8	5
87272	Oslo/SWP 2601	3	3	0
87273	Oslo/SWP 2607	44	8	36
87274	* Oslo/SWP 2613	12	12	0
87275	* SWP 2599/Nordic	2	2	0
87276	* SWP 2599/Oslo	3	3	0
87277	SWP 2599/U761-J4-B6-B1	38	8	30
87278	* SWP 2599/SWP 2613	10	10	0
87279	* SWP 2599/SWP 9302	3	3	0
87280	SWP 2599/SWP 9521	3	3	0
87281	* SWP 2607/SWP 9302	6	6	0
87282	* SWP 2613/Oslo	5	0	5
87283	* SWP 2613/SWP 2599	31	6	25
87284	SWP 9249/Ltbr	6	6	0
87285	SWP 9249/SWP 2599	15	8	7
87286	SWP 9249/SWP 2613	40	10	30
87287	SWP 9302/Ltbr	7	7	0
87288	* SWP 9302/Nordic	15	0	15
87289	SWP 9302/U761-J4-B6-B1	28	8	20
87290	SWP 9302/SWP 2590	151	10	121
87291	* SWP 9302/SWP 2599	46	10	21
87292	* SWP 9302/SWP 2607	3	3	0
87293	SWP 9521/U761-J4-B6-B1	15	8	7
87294	SWP 9521/SWP 2607	20	10	10
87295	SWP 9525/Nordic	4	4	0
87296	SWP 9525/Norstar	1	1	0
87297	SWP 9525/U761-J4-B6-B1	44	8	36
87298	SWP 9525/SWP 2590	31	8	23

* Seed of reciprocal cross available.

87299-97A	Nordic/87219-97 [Nordic*2//Oslo*2/RL 4137]	21	10	11
87299-97B	Nordic/87219-97	9	9	
87299-97C	Nordic/87219-97	1	1	
87300	Nordic/87266 [Nordic*2/3/HY 358/HY 912//HY 320]	8	8	
87301	Nordic/87260 [Nordic//SWP 9249/Ltbr]	24	14	10
87302-91	Oslo/87205-91 [Oslo*4/RL 4137]	4	4	
87302-94A	Oslo/87205-94	10	10	
87302-94B	Oslo/87205-94	2	2	
87302-94C	Oslo/87205-94	1	1	
87302-94D	Oslo/87205-94	1	1	
87302-96A	Oslo/87205-96	12	12	
87302-96B	Oslo/87205-96	8	8	
87302-96C	Oslo/87205-96	3	3	
87302-96D	Oslo/87205-96	1	1	
87302-96E	Oslo/87205-96	1	1	
87302-102A	Oslo/87205-102	24	14	10
87302-102B	Oslo/87205-102	11	11	
87302-102C	Oslo/87205-102	3	3	
87302-102D	Oslo/87205-102	2	2	
87302-102E	Oslo/87205-102	1	1	
87302-102F	Oslo/87205-102	1	1	
87303-97A	Oslo/87219-97 [Oslo/3/Nordic//Oslo*2/RL 4137]	10	10	
87303-97B	Oslo/87219-97	5	5	
87304	Oslo/87226 [Oslo/4/Nordic/3/HY 358/HY 912//HY 320]	5	5	
87305-87	Oslo/87233-87 [Oslo/3/SWP 9249//Oslo*2/RL 4137]	1	1	
87306	Oslo/87260 [Oslo//SWP 9249/Ltbr]	2	2	
87307-91	SWP 9249/87205-91 [SWP 9249//Oslo*3/RL 4137]	2	2	
87307-94A	SWP 9249/87205-94	5	5	
87307-94B	SWP 9249/87205-94	1	1	
87307-96A	SWP 9249/87205-96	4	4	
87307-96B	SWP 9249/87205-96	2	2	
87307-102A	SWP 9249/87205-102	12	6	6
87307-102B	SWP 9249/87205-102	9	9	
87307-102C	SWP 9249/87205-102	3	3	
87307-102D	SWP 9249/87205-102	1	1	
87308-87A	SWP 9249/87233-87 [SWP 9249*2//Oslo*2/RL 4137]	12	6	6
87308-87B	SWP 9249/87233-87	4	4	
87308-87C	SWP 9249/87233-87	1	1	
87309-97	SWP 9249/87243-97 [SWP 9249/3/SWP 9302//Oslo*2/RL 4137]	4	4	
87310-94	SWP 9302/87205-94 [SWP 9302//Oslo*3/RL 4137]	1	1	
87310-96A	SWP 9302/87205-96	22	12	10
87310-96B	SWP 9302/87205-96	12	12	
87311-97	SWP 9302/87243-97 [SWP 9302*2//Oslo*2/RL 4137]	6	6	
87312	SWP 9521/87258 [SWP 9521/3/SWP 9520/QT 8132//SWP 9521]	13	8	5

Table 15. 1987 sws-summer crossing program

CROSS NO.	PEDIGREE	SEEDS HARVESTED	SEEDS SENT TO CHILE
(B) SWS			
87612	FIELDER/SWP 2601	3	0
87613	BZ 684-24/K 321	275	255
87614	OWENS/SWP 2601	3	0
87615	OWENS/POTAM	23	0

1986

PROJECT

Selection and Evaluation of Improved High Yielding Spring Wheats for the Canada Prairie and Soft White Spring classes.

PROGRESS REPORT FOR 1986 AS PER APPENDIX "A".

The past year has been marked by a number of highlights for the Saskatchewan Wheat Pool's ongoing CPS/SWS wheat breeding program.

Starting with the most advanced material:

REGISTRATION STAGE

1- The cultivar "Oslo" developed by Nickerson American Plant Breeders (NAPB) is being put forth for registration by the SWP at the time of this writing. The Pool is the NAPB representative in Western Canada and initially tested Oslo in 1981 as part of its ongoing cultivar evaluation effort. Oslo is a semidwarf, awned wheat with CPS quality and kernel characteristics but Neepawa maturity. The early maturity of Oslo should be desirable for the Parkland wheat growing region of the Prairies for which no short-season cultivars are currently registered. In longer-season, non-drought, growing regions where crop lodging can be a problem Oslo's reduced height and very good straw strength should benefit CPS wheat growers.

CO-OP TESTING STAGE

2- A number of promising CPS wheat lines bred by the SWP have been tested in official co-operative yield tests during 1985 and 1986.

SECOND YEAR CO-OP ENTRIES

a) SWP 9521 (=PT 806) is a white seeded, early maturing (=Neepawa) CPS quality semidwarf, awned wheat. Based on two years of testing in the Parkland Co-op (1985 & 1986) Test indicates that SWP 9521 yielded 11% more than Neepawa. The CPS (White) class of wheat does not exist at this time but it is anticipated that the Canadian Wheat Board will be market testing this product in 1987/1988. It should be noted that Oslo and SWP 9521 represent the only short-season CPS lines combining acceptable quality and kernel characteristics as well as a 10+% yield advantage over Neepawa in Co-op testing to date. SWP 9521 will be advanced for third year testing in the Parkland Co-op and a one year evaluation in the HY Co-op.

b) SWP 730 (=HY 919) is a red-seeded, full-season, improved CPS quality awned semidwarf line. Based on two years of testing in the HY Co-op HY 919 yielded 8.6% less than HY 320 but 18.4% more than Neepawa. Although HY 919 yields less than HY 320 its dough handling and baking properties are considered markedly superior to those of HY 320. HY 919 will be tested for a third year in the HY Co-op.

FIRST YEAR CO-OP ENTRIES:

c) SWP 9249 (=HY 929) is a full season CPS (Red) line with some improved quality characteristics relative to HY 320. This semidwarf, awned wheat was in its first year of Co-op testing in 1986 and yielded the same as HY 320. SWP 9249 was one of the highest yielding entries in 1986 SWP yield trials (See Tables 1 to 4 for 1986 SWP Yield Trial Data) SWP 9249, however, was characterized by poor weathering tolerance as indicated by a low Falling Number Value and high alpha-amylase activity. This line will be tested a second year to confirm the above results.

d) SWP 9302 (=PT 809) is a mid-to-full season semidwarf, awned CPS (Red) line which was the top yielder in the 1986 Parkland Co-op. This line out yielded HY 320 by a small margin (2.6%) but is characterized by improved CPS quality traits. SWP 9302 was also a top yielder in SWP yield trials. SWP 9302 is not early maturing enough for the Parkland area hence this line will be tested in the HY Co-op in 1987.

e) SWP 847 (=PT 808) is a semidwarf awned utility (Glenlea quality and kernel type) wheat which yielded 8% more than Glenlea and matured at about the same time. The quality of PT 808 was inferior to Glenlea hence this line will not be tested further.

f) SWP 9525 (=PT 810) is a CPS (White) line which had the maturity of the earliest CWRS wheat cultivar currently recommended in Canada (=Park) but out-yielded that cultivar by 21.6%. As is the case with SWP 9521 this line would be suitable for registration in the anticipated CPS white-seeded class of wheat in 1989 or 1990. Both SWP 9521 and 9525 have improved (lower) alpha-amylase levels than other CPS (white) lines.

g) SWP 9254 (=HY 930) yielded 18.3% less than HY 320 and only 4.5% better than Neepawa in the 1986 HY Co-op. This CPS (Red) line had good quality characteristics but inadequate leaf rust resistance and yield potential and is consequently being dropped from further testing.

LINES SUBMITTED FOR CO-OP TESTING IN 1987:

a) SWP 2599 (HY 320/WRC 77-1) is a full season maturity (=HY 320) CPS (Red) semidwarf wheat with awned spikes which yielded 4% better than HY 320. The quality and rust resistance levels of SWP 2599 appear to be superior to those of HY 320. Kernels of SWP 2599 are distinguishable from those of CWRS cultivars. SWP 2599 is being entered in the HY Co-op.

LINES WITH POTENTIAL AS PARENTS

Of the 46 CPS/SWS lines which were extensively tested for the first time in 1986 (SWP 1019 through to SWP 2623) only one (SWP 2599) met all the quality, disease resistance, kernel distinguishability and yield criteria to warrant Co-op testing. Some of the lines rejected based on quality considerations out yielded HY 320 by substantial margins (eg SWP 1601, 1602, 1607, 1635, 2591 and 2613). Some of these lines will be used in crossing programs with better quality CPS type wheats.

Advanced generation early maturing CPS, lines which previously appeared to have some potential were severely infected during the 1986 rust episode and as a result yielded less than Oslo. Consequently, this material has been culled from the program.

Most of the lines derived from crosses with the sprouting tolerant, white-seeded parent, Kenya 321 (syn. K 321) unfortunately had kernels which were too soft for the CPS class but a gluten strength in excess of that desired for the SWS class. The same was true for most lines from the cross HY 320/ND 50 (eg. SWP 1601-1611) however, as previously mentioned, some of these lines out yielded HY 320, partly because of their superior leaf rust resistance.

EARLY GENERATION MATERIAL (F2-F6)

Approximately 2,000 single plant selections were made from remnant seed of populations generated by the SWP breeding program between 1979 and 1981 (table 5) many of these populations had HY 320 in their parentage and had turned out to be a source of homozygous lines with improved quality traits as well as early maturity and/or high yield potential. These crosses were all made prior to the creation of the CPS class in 1985, consequently, with new quality selection criteria it will be possible with the use of our winter nursery and recently acquired improved quality testing equipment to develop CPS semidwarf lines for yield testing as early as 1987 and 1988.

In addition, seven new F2 populations were evaluated in 1986. The CPS segregating plots accounted for 64% of the wheat bulk populations grown, compared to less than 5% during the previous three years.

A small number of F6 lines for which the SWS cultivar Fielder was a parent were screened for quality as well as rust resistance in 1986. Approximately 10 of those lines warrant yield testing in 1987.

NEW BREEDING MATERIAL

The CPS and SWS program was expanded further in 1986 with the addition of 85 new crosses in the CPS category and 40 in the SWS category (table 6). Seed produced by this crossing program was planted at either a winter nursery site or in the SWP/PDB growthroom facility at Watrous. A backcrossing program has been initiated in order to transfer the sprouting tolerance of RL 4137 into Oslo and HY 320 - maturity lines. As has been the case previously, both red and white-seeded genotypes will be selected. By using the backcross approach one should be able to overcome the large population sizes required by the pedigree method to recombine the yield potential, quality and kernel characteristics of CPS semidwarf lines with the sprouting tolerance of the CWRS line, RL 4137. Similarly, the white-seeded source of sprouting resistance, Kenya 321, is tall, awnless, late maturing and highly susceptible to leaf rust. These traits are diametrically opposed to those desired in either the CPS (White) or SWS classes. Consequently, either the breeding methodology or the source of sprouting tolerance have to be changed in the development of improved white seeded lines. Improved white seeded sources of sprouting resistance have been identified at the ACRS in Swift Current as well as by researchers in Australia.

Backcrossing programs for both loose smut (Ustilago tritici) and bunts (Tilletia sp.) will be initiated in 1987. We are presently trying to determine whether the environmental conditions in existing growthroom facilities are adequate for inoculation and disease development purposes. Based on the results from these initial inoculations carried out in January and February of 1987 we should be able to determine whether these disease screening programs will be limited to field inoculations (which sometimes results in inconsistent infection levels) or whether a supplementary controlled environment disease screening approach will be feasible. The above will determine the speed of the backcrossing program. Currently, Agriculture Canada programs are in the process of or have just finished incorporating loose smut and bunt resistance into HY 320. Since HY 320 is not considered desirable from a quality standpoint, this newly incorporated disease resistance will have to be transferred to new lines with 'Oslo' or 'Nordic' quality levels. The latter objective is presently being addressed by the SWP's CPS breeding program.

The main objective of the soft white spring wheat breeding program is to increase the leaf and stem rust resistance levels of Fielder-quality wheat. A second objective, which will be addressed in 1987, pertains to increasing the sprouting tolerance of SWS wheats. Newer sources of sprouting tolerance will be evaluated and crossed to existing SWS lines. The combination of improved rust and sprouting resistance should eventually allow for SWSW production in the eastern prairies.

EXPENDITURES

Expenditures for the first year of this project are listed in table 7. ERDA funding received to date covered approximately 65% of the CPS/SWS breeding program this past year.

The breeding program is projected to increase in size by approximately 25% in 1987/88. A fourth Saskatchewan yield testing site will be added in 1987. This site in the Tisdale area will fill an obvious gap in the North-East. Overall expenses for 1987/88 will rise by 15 to 20% over the current year.

EQUIPMENT PURCHASES

No equipment purchases were made with ERDA funding.

However, equipment purchases funded wholly by the Saskatchewan Wheat Pool in 1986 (not ERDA) totalled a further $71,000. In order to cope with an expansion in the CPS/SWS breeding program a new plot combine was purchased as well as a Dickey-john NIR unit for preliminary quality analyses. Other capital expenditures included lab balances, a plot seeder upgrading and the construction of a summer greenhouse.

OTHER EXPENDITURES

An 'enhanced cereal management' agronomic study comparing Oslo to HY 320 and Katepwa at four sites was also wholly funded by the SWP in 1986.

PERSONNEL

A list of personnel involved in the CPS/SWS breeding program is presented in table 8.

TABLE 1. SWP Y III (F) - SUMMARY OF DATA FOR 1986 (WATROUS, OUTLOOK, IRRICANA AND ENCHANT)

	LINE OR CULTIVAR	PEDIGREE	HEAD TYPE	KERNEL TYPE	1000K (G)	YIELD (%Mp)	MATURE (DAYS)	TEST WT KG/HL	HEIGHT (CM)	RUST RESPONSE LEAF	RUST RESPONSE STEM	PROTEIN (%).	NIRI
1.	NEEPAWA		AL	R,HRS	34.3	100	95	75	94	30M	10R	13.5	98
2.	COLUMBUS		AL	R,HRS	35.4	95	97	76	100	TR	20R-MR	13.2	103
3.	HY 320		A	R,3M	37.5	113	97	74	78	10R	20R	11.1	37
4.	OSLO		A	R,3M	37.0	114	91	76	71	MR	R-MR	12.1	56
5.	FIELDER		A	W,SWS	33.2	112	98	73	82	VS	MS	9.4	25
6.	SWP 730+	HY 320/OXLEY	A	R,3M	35.7	102	98	72	82	MS	MR	11.3	76
7.	SWP 9521+	N 066/BB.../5/RL 4137	A	W,3M	38.9	108	91	74	72	MR	R	12.1	85
8.	SWP 9525+	"	A	W,3M	37.5	104	92	74	78	MR	VR	11.6	60
9.	SWP 847+	906 R/S 41529	A	R,3M	40.9	107	96	74	79	30MR	10VR	12.9	104
10.	SWP 9302+	BB/3/TZPP/SN...	A	R,3M	41.9	129	95	74	79	1R	10VR	11.4	73
11.	SWP 9249+	6 WA 693/HY 320	A	R,3M	38.8	129	98	72	85	MR	R	10.7	76
12.	SWP 9254+	HY 320/6 WA 644	A	R,3M	34.7	99	98	71	78	S	R	10.3	76
13.	SWP 735	ND 50/PITIC 62	A	R,3M	33.2	93	98	71	87	S	MR	10.4	17
14.	SWP 830	HY 320/OXLEY	A	R,3M	32.9	97	99	72	80	S	R	10.8	76
15.	SWP 746	K 321/OXLEY	A	R,3M	32.0	107	98	71	84	30MR	30MS	10.3	3
16.	SWP 763	906 R/S 41529	A	R,3M	33.1	108	95	74	78	S	R	12.3	86
17.	SWP 777	"	A	R,3M	35.5	105	97	73	84	S	MR	10.3	85
18.	SWP 842	K 321/OXLEY	A	R,3M	32.1	115	97	70	87	S	MR	10.9	0
19.	SWP 9259	HY 320/908 R	A	R,HRS+3M	36.6	94	94	71	81	10MR	10VR	12.8	87
20.	SWP 9260	"	A	R,3M	37.3	94	93	76	78	40M	20R	11.9	100
21.	SWP 9273	HY 320/WRC 77-5	A	R,HRS+3M	36.2	106	96	70	78	30MR	10VR	11.9	81
22.	SWP 9487	WRC 77-3/RL 4137	A	R,3M	30.8	95	97	72	74	S	R	11.0	15
23.	SWP 9520	N 066/BB.../5/RL 4137	A	W,3M	36.3	83	94	69	74	1R	10VR	11.1	22
24.	SWP 9535	K 321/6 WA 693	A	W,3M	36.3	83	93	70	72	S	VR	10.5	21

Head and Kernel Characteristics: AL = Awnless, A = Awned, GL = Glenlea; R = Red, LR = Light Red, W = White; HRS = Hard Red Spring, 3M = Canada Prairie Spring, SWS = Soft White Spring; NIRI = Near infared reflectance index for kernel hardness.

+ = Lines in 1986 Co-op trials

* = Lines selected for entry into 1987 Co-op trials

Rust Response data are amalgamated from (SWP) Portage and N. Battleford or (CDA) Winnipeg.

VR = Very Resistant, R = Resistant, MR = Moderately Resistant, MS = Moderately Susceptible, S = Susceptible, VS = Very Susceptible

TABLE 2 . SWP Y III (G) - SUMMARY OF DATA FOR 1986 (WATROUS, N. BATTLEFORD, OUTLOOK, IRRICANA AND ENCHANT)

	LINE OR CULTIVAR	PEDIGREE	HEAD TYPE	KERNEL TYPE	1000K (G)	YIELD (%Mp)	MATURE (DAYS)	TEST WT KG/HL	HEIGHT (CM)	RUST RESPONSE LEAF	RUST RESPONSE STEM	PROTEIN (%)	HIRI
1.	NEEPAWA		AL	R,HRS	32.2	100	94	72	96	30M	10R	14.4	100
2.	COLUMBUS		AL	R,HRS	34.2	98	97	75	104	TR	20R-MR	13.9	107
3.	HY 320		A	R,3M	34.7	115	98	73	81	10R	20R	11.1	45
4.	OSLO		A	R,3M	36.1	103	92	74	75	MR	R-MR	12.3	59
5.	FIELDER		A	W,SWS	31.2	106	98	71	87	VS	MS	9.6	19
6.	SWP 780191	ERA/4/.../5/HY 320	A	R,3M	34.5	87	95	73	83	30MR	R	11.6	30
7.	SWP 780292	HY 320//UM 607 A/WALDRON	A	R,3M	39.4	92	93	72	70	30MR	MS	12.2	89
8.	SWP 780521	FAO 14595/EC//POTAM	A	LR,HRS+GL	32.2	101	94	71	78	10MR	MR	10.4	15
9.	SWP 780562	ERA/CP//GLENLEA	A	LR,HRS+GL	32.1	99	95	72	81	10OS	VR	11.3	24
10.	SWP 780742	PITIC/GAINES//HY 320	A	R,3M	35.9	100	97	72	86	40MR	MR	10.3	16
11.	SWP 1019	K 321/ND 50//WPB-3MW	A	R,3M	32.2	104	93	71	82	30M	30MR-MS	11.4	72
12.	SWP 1630	"	A	W,3M	33.4	94	96	68	81	20M	30MR-R	11.7	4
13.	SWP 1631	"	A	W,3M	37.7	100	96	72	92	20MR	40MS	11.5	11
14.	SWP 1636	"	A	W,3M	33.1	94	97	69	82	10MR	30MS	11.5	5
15.	SWP 1593	HY 320/SUW 797-1	A	LR,3M	34.5	102	97	74	86	TR	20MR-R	13.1	87
16.	SWP 1594	HY 320/SUW 797-1	A	W,3M	34.3	106	96	73	83	TR	20R	13.0	93
17.	SWP 1595	"	A	LR,3M	35.4	84	95	72	94	TR	20R	11.2	30
18.	SWP 1597	"	A	LR,3M	33.1	103	97	74	86	TR	20R	13.1	90
19.	SWP 1598	"	A	LR,3M	35.1	96	96	73	85	IR	20R	13.1	87
20.	SWP 1599	"	A	LR,3M	33.8	98	97	73	86	IR	20R	13.0	85
21.	HY 320		A	R,3M	34.2	104	98	73	82	MR	R-MR	10.2	53
22.	SWP 1642	HY 320/OXLEY//WPB-3M	A	R,3M	32.4	77	93	70	83	80S	20R	11.9	66
23.	SWP 1646	"	A	R,3M	36.4	85	95	70	76	10R	10R	12.2	68
24.	SWP 1649	"	A	R,3M	33.8	78	93	68	84	80S	20R	11.6	64

See subscripts in [redacted]1 .

TABLE 3. SWP Y III (H) - SUMMARY OF DATA FOR 1986 (WATROUS, N. BATTLEFORD, OUTLOOK, IRRICANA AND ENCHANT)

	LINE OR CULTIVAR	PEDIGREE	HEAD TYPE	KERNEL TYPE	1000K (G)	YIELD (%Mp)	MATURE (DAYS)	TEST WT KG/HL	HEIGHT (CM)	RUST RESPONSE LEAF	STEM	PROTEIN (%)	MIRI
1.	NEEPAWA		AL	R,HRS	32.8	100	94	75	99	30M	10R	12.9	100
2.	COLUMBUS		AL	R,HRS	35.1	98	96	75	106	TR	20R-MR	13.0	103
3.	HY 320		A	R,3M	36.7	116	98	74	83	10R	20R	10.8	39
4.	OSLO		A	R,3M	36.8	112	91	74	77	MR	R-MR	11.8	58
5.	FIELDER		A	W,SWS	32.1	110	98	73	87	VS	MS	9.4	21.
6.	SWP 1650	HY 320/OXLEY//WPB-3M	A	W,3M	33.8	92	97	71	91	TR	10VR	11.1	12
7.	SWP 1651	"	A	W,3M	31.5	89	97	71	95	TR	10VR	11.2	15
8.	SWP 1601	HY 320/ND 50	A	R,3M	38.0	129	96	74	83	3R	20R	10.6	31
9.	SWP 1602	"	A	R,3M	38.3	128	98	75	84	TR,10R	20R	10.7	22
10.	SWP 1603	"	A	LR,3M	32.7	102	98	70	86	5R	30MS	10.6	10
11.	SWP 1605	HY 320/ND 50	A	R,3M	39.2	94	92	70	70	5MR	60S	11.3	69
12.	SWP 1606	"	A	R,3M	41.7	94	98	71	87	10M	20R	11.7	79
13.	SWP 1607	"	A	R,3M	36.8	121	97	74	84	10MR	30R	11.0	26
14.	SWP 1608	"	A	LR,3M	32.6	109	96	72	91	10MR	30R-MR	11.1	66
15.	SWP 1609	"	A	LR,3M	36.2	108	97	73	87	TR	30R-MR	11.4	12
16.	SWP 1610	HY 320/ND 50	A	LR,3M	33.1	110	97	71	76	1R	10R	11.5	15
17.	SWP 1611	"	A	LR,3M	32.1	93	99	70	87	100S	MR	10.9	4
18.	SWP 1635	K 321/ND 50//WPB-3MW	A	LR,3M	35.8	120	97	74	85	10R	R	10.4	24
19.	SWP 1628	"	A	W,3M	36.9	109	97	73	92	80S	VR	10.7	13
20.	SWP 1580	HY 320/SUW797-1//...PITIC	A	W,3M	35.2	114	95	72	85	40MR	VR	11.1	4
21.	SWP 1643	HY 320/OXLEY//WPB-3MW	A	R,3M	33.7	78	94	70	88	80S	20R	11.6	68
22.	SWP 1644	"	A	R,3M	32.1	81	94	70	84	80S	20R	11.6	63
23.	SWP -	-	-	-	-	-	-	-	-	-	-	-	-
24.	SWP 1647	HY 320/OXLEY//WPB-3MW	A	LR,3M	35.7	94	96	70	81	100S	R-MR	11.2	64

See subscripts in table 1.

TABLE 4 . SWP Y III (I) - SUMMARY OF DATA FOR 1986. (WATROUS, N. BATTLEFORD, OUTLOOK, IRRICANA AND ENCHANT)

	LINE OR CULTIVAR	PEDIGREE	HEAD TYPE	KERNEL TYPE	1000K (G)	YIELD (%Np)	MATURE (DAYS)	TEST WT KG/HL	HEIGHT (CM)	RUST RESPONSE LEAF	RUST RESPONSE STEM	PROTEIN (%)	MIRI
1.	NEEPAWA		AL	R,HRS	34.1	100	94	74	99	30M	10R	13.8	113
2.	COLUMBUS		AL	R,HRS	35.9	95	97	75	105	TR	20R-MR	13.9	108
3.	HY 320		A	R,3M	34.5	111	98	73	85	10R	20R	10.6	51
4.	OSLO		A	R,3M	37.2	117	92	74	78	MR	R-MR	11.9	64
5.	FIELDER		A	W,SWS	32.8	108	98	73	87	VS	MS	9.5	25
6.	SWP 1630	K 321/ND 50//WPB-3MW	A	W,3M	34.2	98	96	68	81	60MS	MS	11.4	4
7.	NEEPAWA		AL	R,HRS	33.6	96	95	73	100	40MR	VR	-	-
8.	SWP 1638	K 321/ND 50//WPB-3MW	A	LR,3M	31.3	97	97	70	85	100S	R-MR	11.8	79
9.	NEEPAWA		AL	R,HRS	34.7	98	94	74	99	50MR	VR	-	-
10.	SWP 1648	HY 320/OXLEY//WPB-3M	A	R,3M	35.8	90	97	72	85	100S	MR	11.3	65
11.	CIMMYT S1	(DURUM)	A	-	42.7	114	98	75	90	40MR	R	13.5	159
12.	SWP 2590	HY 320/WRP 8-27*	A	R,3M	36.0	114	98	72	92	5R	R-MR	11.4	91
13.	SWP 2591	"	A	R,3M	39.0	128	99	76	97	10R	VR	10.3	29
14.	SWP 2607	HY 912/WRP 8-27	A	R,RHS,L	41.6	116	93	76	81	10R	MR	13.3	99
15.	SWP 2609	"	A	R,HRS,L	43.1	107	96	74	87	5R	R-MR	13.6	103
16.	SWP 2613	HY 912/WRP 8-27	A	R,HRS,L	42.2	125	95	74	83	10R	R-MR	12.7	110
17.	SWP 2604	"	A	R,HRS,L	39.6	104	95	74	83	30MR	MR	13.0	69
18.	SWP 2596	HY 320/WRC 77-1	A	R,3M	37.2	110	97	72	89	40MR	MR	13.1	82
19.	SWP 2597	"	A	LR,3M	42.3	117	97	74	88	5R	VR	11.4	5
20.	SWP 2599	"	A	R,3M	37.4	115	99	76	91	TR	VR	12.2	84
21.	SWP 2600	HY 320/WRC 77-2	A	R,3M	40.9	115	97	74	88	TR	VR	11.5	11
22.	SWP 2601	"	A	R,3M	40.3	115	97	75	83	5R	VR	12.2	10
23.	SWP 2623	HY 912/PT 325	A	R,HRS,L	42.0	110	94	75	90	40MR	VR	11.8	81
24.	80S 8203		A	R,3M	33.8	95	95	74	87	5R	S	11.2	78

See subscripts in table 1 .

TABLE 5. LIST OF CPS F2 SELECTIONS MADE IN 1986.

CROSS	PEDIGREE	NO. OF SELECTIONS
85201	HY 912/ HY 320	65
85202	HY 320/QT 8132	20
85203	SWP 9520/SWP 780191	93
85204	SWP 9520/QT 8132	26
85205	SWP 780191/HY 912	83
85206	SWP HY 912/780191	16
85207	HY 320/HY 912	8
81201	HY 320/SUW 797-1	54
81202	HY 320/OXLEY	18
81204	HY 320/ND 50	7
81209	K 321/SUW 797-1	11
81210	K 321/OXLEY	6
80225	HY 320/OXLEY	24
80230	HY 320/ND 50	16
80236	ND 50/PITIC 62	7
80242	K 321/ND 50	4
80421	GLENLEA/KE HAN #6	12
80431	906 R/S 41529	25
79201B	W 15962/HY 320	16
79202A	HY 320/6 WA 693	85
79202B	6 WA 693/HY 320	139
79203A	HY 320/6 WA 644	107
79203B	6 WA 644/HY 320	107
79205A	HY 320/908 R	33
79206B	15-61/HY 320	40
79208A	HY 320/WRC 77-5	32
79208B	WRC 77-5/HY 320	18
79209B	PROSPUR/HY 320	68
79210B	CNO/SN//TZPP/NAPO/3/HY 320	12
79211A	HY 320/3 AT 66/CMN//POLK/ROQUE	25
79211B	AT 66/CMN//POLK/ROQUE/3/HY 320	13
79212B	NURI/WALDRON//HY 320	58
79213B	ERA/2* PROTOR//HY 320	35
79214B	BB/3/TZPP/SN//NAPO/4/HY 320	51
79215B	NO 66/BB/3/CNO//NAD/CHR/4/7 C/5/HY 320	58
79606A	6 WA 693/RL 4137	20
79606B	RL 4137/6 WA 693	7
79607A	6 WA 644/RL 4137	15
79612A	WRC 77-3/RL 4137	6
79612B	RL 4137/WRC 77-3	3
79613B	RL 4137/WRC 77-5	18
79614A	PROSPUR/RL 4137	8
79616A	AT 66/CMN//POLK/ROQUE/3/RL 4137	14
79616B	RL 4137/3/AT 66/CMN//POLK/ROQUE	3
79618A	ERA/2* PROTOR//RL 4137	16
79618B	RL 4137//ERA/2* PROTOR	19
79619A	BB/3/TZPP/SN//NAPO/4/RL 4137	8
79620A	NO 66/BB/3/CNO//NAD/CHR/4/7 C/5/RL 4137	18

a e 5 cont'd

CROSS	PEDIGREE	NO. OF SELECTIONS
79627B	K 321/6 WA 693	10
79628A	6 WA 644/K 321	8
79630B	K 321/908 R	3
79632B	K 321/55-61	5
79637B	K 321/3/AT 66/CMN//POLK/ROQUE	5
79638B	K 321//NURI/WALDRON	5
79639A	ERA/2* PROTOR//K 321	12
79639B	K 321//ERA/2* PROTOR	13
79641A	NO 66/BB/3/CND//NAD/CHR/4/7 C/5/K 321	2
79642B	K 321/904 R	2
79645A	PROSPUR/K 321	1
79645B	K 321/PROSPUR	13

LIST OF CPS F4 SELECTIONS MADE IN 1986.

CROSS	PEDIGREE	NO. OF SELECTIONS
79201B-2BW	W 15962/HY 320	2
79206	15-61/HY 320	8
79208B-1BW	WRC 77-5/HY 320	8
79209B	PROSPUR/HY 320	4
79212B-1BW	HY 320//NVRI/WALDRON	6
79213B	ERA/2* PROTOR//HY 320	4
79215B-1BW	NO 66/BB/3/CNO//NAD/CHR/4/7 C/5/ HY 320	4
79606B	RL 4137/6 WA 693	1
79607A	6 WA 644/RL 4137	1
79614A	PROSPUR/RL 4137	3
79618A	ERA/2* PROTOR//RL 4137	4
79619A	BB/3/TZPP/SN/NAPO/4/RL 4137	3
79636B	K 321/NK 78 S 9125	1
79637B	K 321/3/AT 66/CMN//POLK/ROQUE	1
79638B	K 321//NURI/WALDRON	1
79643B-2BW	K 321/WRC 77-5	2
79645A	PROSPUR/K 321	3
79645B	K 321/PROSPUR	1

LIST OF CPS F5 SELECTIONS MADE IN 1986.

CROSS	PEDIGREE	NO. OF SELECTIONS
79201B-1BW	W 15962/HY 320	3
79202A-1BW	HY 320/6 WA 693	4
79203A	HY 320/ 6 WA 644	2
79205A-1BW	HY 320/908 R	1
79206B-1BW	15-61/HY 320	4
79210B-1BW	CNO/SN//TZPP/NAPO/3/HY 320	6
79212B-1BW	HY 320//NURI/WALDRON	11
79213B-1BW	ERA/2* PROTPR//HY 320	15
79606A-2BW	6 WA 693/RL 4137	1
79613B-2BW	RL 4137/WRC 77-5	1
79614A-2BW	PROSPUR/RL 4137	1
79619A-2BW	BB/3/TZPP/SN//NAPO/4/RL 4137	3
79620A-1BW	NO 66/BB/3/CNO//NAD/CHR/4/7 C/5/RL 4137	9
79620A-2BW	"	6
79627B	K 321/6 WA 693	7

TABLE 6. CPS FIELD CROSSES MADE IN 1986

CROSS	PEDIGREE	NO. OF SEEDS HARVESTED	NO. OF SEEDS SENT TO CHILE
86201	HY 320/OSLO	11	0
86202	HY 320/HY 362	9	0
86203	HY 320/SWP 9302	1	0
86204	HY 320/SWP 757	27	0
86205	SWP 757/HY 320	18	18
86206	HY 320/SWP 780191	6	0
86207	SWP 780191/HY 320	31	31
86208	HY 320/SWP 9520	20	0
86209	SWP 9520/HY 320	25	25
86210	HY 320/SWP 9525	8	0
86211	SWP 9525/HY 320	61	36
86212	HY 320/85 U 0674	20	3
86213	HY 320/WHEATON	15	0
86214	WHEATON/HY 320	36	36
86215	NORDIC/HY 320	17	0
86216	HY 358/HY 320	8	0
86217	HY 912/OSLO	29	12
86218	HY 352/OSLO	8	0
86219	OSLO/HY 352	6	6
86220	OSLO/RL 4137	37	21
86221	SWP 9249/OSLO	16	5
86222	SWP 9254/OSLO	15	0
86223	OSLO/85 U 0674	26	13
86224	HY 362/OSLO	14	6
86225	WHEATON/OSLO	14	0
86226	OSLO/WHEATON	9	9
86227	NORDIC/OSLO	7	0
86228	SWP 730/OSLO	20	9
86229	HY 358/OSLO	28	11
86230	CAJEME/OSLO	70	53
86231	HY 320/CAJEME	42	25
86232	SWP 9249/SWP 9525	13	0
86233	SWP 730/SWP 9525	19	0
86234	SWP 9525/RL 4137	40	23
86235	HY 358/HY 912	8	0
86236	HY 358/SWP 9525	4	0
86237	HY 358/SWP 9302	1	0
86238	HY 358/NORDIC	19	6
86239	HY 358/WHEATON	6	0
86240	HY 912/SWP 9525	5	0
86241	HY 912/SWP 757	2	0
86242	HY 912/SWP 9254	5	0
86243	HY 912/HY 352	38	25
86244	OSLO/SWP 9302	10	0
86245	OSLO/SWP 757	18	0
86246	OSLO/SWP 9525	11	0
86247	WHEATON/SWP 9525	4	0
86248	NORDIC/SWP 9254	10	0
86249	WHEATON/SWP 730	3	0
86250	NORDIC/SWP 9525	6	0
86251	NORDIC/SWP 9520	5	0
86252	NORDIC/SWP 9249	6	0
86253	SWP 9249/CAJEME	1	0
86254	SWP 9249/85 U 0674	11	0
86255	SWP 9254/85 U 0674	4	0
86256	SWP 9254/HY 320	1	0
86257	SWP 9254/SWP 9525	5	0
86258	SWP 757/RL 4137	41	30
86259	HY352/SWP 9525	12	0
86260	CAJEME/SWP 9254	10	0
86261	CAJEME/HY 912	1	0
86262	CAJEME/SWP 9520	10	0
86263	NORDIC/SWP 757	8	0
86264	SWP 9525/OSLO	1	0

TABLE 6.... SWS FIELD CROSSES MADE IN 1986

CROSS	PEDIGREE	NO. OF SEEDS HARVESTED	NO. OF SEEDS SENT TO CHILE
86601	OWENS/FIELDER	13	0
86602	FIELDER/OWENS	53	53
86603	SWP 735/FIELDER	43	32
86604	SWP 746/FIELDER	43	32
86605	FIELDER/SWP 9603	2	0
86606	FIELDER/CI 682-70	20	0
86607	SWP 734/FIELDER	70	61
86608	FIELDER/SWP 9535	23	0
86609	SWP 9535/FIELDER	93	93
86610	FIELDER/SWP 9487	7	0
86611	FIELDER/POTAM	34	0
86612	POTAM/FIELDER	36	36
86613	FIELDER/SWP 770	9	0
86614	HY 402/FIELDER	40	30
86615	FIELDER/OSLO	48	31
86616	FIELDER/TINCURRIN	1	0
86617	FIELDER/KEWELL	9	1
86618	FIELDER/OLYMPIC	18	7
86619	FIELDER/INSIGNIA	63	52
86620	FIELDER/LANCE	65	54
86621	OWENS/CI682-70	56	45
86622	OWENS/SWP 9487	18	5
86623	SWP 9603/OWENS	24	16
86624	SWP 746/OWENS	16	8

TABLE 6.... CPS GROWTH ROOM CROSSES (FALL 1986)

CROSS	PEDIGREE	NO. OF SEEDS HARVESTED
86265	OSLO *2/RL 4137 [OSLO/86220]	31
86266	OSLO *2/HY 358 [OSLO/86229]	5
86267	HY 320//HY 358/NORDIC [HY 320/86238]	29
86268	HY 320//OSLO//RL 4137 [HY 320/86220]	18
86269	HY 320/VEERY #2	15
86270	HY 320/KEA "S"	9
86271	HY 320/SWP 9520//HY 358/NORDIC [86208/86238]	16
86272	HY 320/SWP 9520//WHEATON/OSLO [86208/86225]	7
86273	HY 320/85 U 0674/TAN "S" [86212/TAN "S"]	13
86274	HY 320/WHEATON//TAN "S" [86213/TAN "S"]	7
86275	HY 320/WHEATON//OSLO [86213/OSLO]	5
86276	NORDIC/HY 320//VEERY #2 [86215/VEERY #2]	6
86277	NORDIC/HY 320//TAN "S" [86215/TAN "S"]	11
86278	WHEATON/OSLO//HY 320/SWP 9520 [86225/86208]	2
86279	HY 358/*2 OSLO [86229/OSLO]	11
86280	TAN "S"//HY 320/WHEATON [TAN "S"/86213]	1
86281	TAN "S"//SWP 9254/OSLO [TAN "S"/86222]	4
86282	TAN "S"/OSLO	5
86283	VEERY #2/HY 320	10
86284	VEERY #2//HY 320/WHEATON [VEERY #2/86213]	3
86285	HY 358/HY 912//HY 320 [86235/HY 320]	9

SWS GROWTH ROOM CROSSES (FALL 1986)

CROSS	PEDIGREE	NO. OF SEEDS HARVESTED
86625	FIELDER *2/POTAM [FIELDER/86611]	5
86626	FIELDER *2/LANCE [FIELDER/86620]	15
86627	FIELDER/B 2684-24	13
86628	FIELDER/VEERY #2	13
86629	B 2684-24//SWP 9603/OWENS [B 2684-24/86623]	7
86630	B 2684-24//FIELDER/CI 682-70 [B 2684-24/86606]	2
86631	B 2684-24//FIELDER/POTAM [B 2684-24/86611]	1
86632	B 2684-24//FIELDER/INSIGNIA [B 2684-24/86619]	20
86633	B 2684-24//SWP 734/FIELDER [B 2684-24/86607]	8
86634	B 2684-24/VEERY #2	10
86635	FIELDER/SWP 9535//FIELDER/POTAM [86608/86611]	7
86636	FIELDER/SWP 9535//FIELDER/OSLO [86608/86615]	6
86637	FIELDER/POTAM//OWENS/SWP 9487 [86611/86622]	3
86638	FIELDER/OSLO//SWP 9603/OWENS [86615/86623]	18
86639	FIELDER/LANCE//OSLO [86620/OSLO]	3
86640	OWENS/FIELDER//FIELDER/LANCE [86601/86620]	6

TABLE 7

EXPENDITURES ON CPS/SWS WHEAT PROGRAM
MARCH 1, 1986 TO MARCH 1, 1987.

1.	Salaries	
	(a) Professional	$28,955
	(b) Technical & Seasonal	21,399
2.	Operating Costs & Supplies	3,665
3.	Land Rental	1,080
4.	Quality Analyses	6,000
5.	Winter Nursery	6,015
6.	Farm Operations	1,818
7.	Travel & Vehicle Maintenance	4,690
8.	Farm Overhead	12,230
9.	Office Overhead	7,580
		$93,432

TABLE 8

PERSONNEL AND TIME ALLOCATED TO PROJECT

		Position
P. Hucl (May 1, 1986 - March 1, 1987)	90%	Wheat Breeder
L. S. P. Song (March/April 1986)	25%	Senior Wheat Breeder
B. Fowler	24.4%	Tech III
M. Tiessen	24.4%	Tech III
G. Pappenfoot	49%	Summer Staff
C. McLean	49%	Summer Staff